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‘Emerging Innovations and Strategic Business Practices’

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Emerging Innovations and Strategic Business Practices

02nd & 03rd February, 2018

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MANAGEMENT PAPERS

SR.NO	TITLE - AUTHOR	PAPER ID	Page.No
1	India's CSR journey and its trends in India till 2017 - Prof. Deshmukh Sachin, Dr. S. R. Madan, Prof. ShitalBhusare,	EISBPM001	7
2	Horticulture: A Strategic Source of Jammu and Kashmir Economy - MohdAzharUd Din Malik	EISBPM002	13
3	Recruitment And Selection Process At Kinetic Engineering Limited - Dr.Smita A. Kumbhar,	EISBPM003	18
4	A Study on Factors swaying Consumers Decision towards Selection of Private Hospitals- Dr.A.R.Jaswal, Prof. K.S. Shinde, Dr.S.R.Walunj	EISBPM004	24
5	Consumer Adoption Of Digital Banking Channels: Seedling Transformation Towards Cashless India - Dr.A.Bharathy	EISBPM005	29
6	A Study On Facets Of Multicultural Communication In Work Place- K.Sumavally; Dr.K.HemaDivya	EISBPM006	36
7	Improving Performance Management in Health Care Sector– using Balance Scorecard Framework: A study on Select Hospitals in Bengaluru- India - Dr.R. Jayanthi;	EISBPM007	43
8	INDIAN ECONOMY: A JOURNEY TOWARDS VISION 2020 - Dr. V. M. Tidake; Prof. S.P. Ghodake,	EISBPM008	51
9	Investors' Perception Towards Volatility For Strategizing Financial Products - Dr. Anjali Bhute,	EISBPM009	55
10	Role And Compliance Of GST In Enhancing Credit Rating Services – Sunitha Gudhe; Dr.RinkuSanjeev.	EISBPM010	63
11	Emerging Innovations And Strategic Business Practices In Marketing - SurinderDhingra,	EISBPM011	68
12	A Study of Labor Absenteeism in Selected Industrial Units in Ahmednagar District (M.S.) - Prof. Rahul D. Thorat	EISBPM012	74
13	Human Resource Development Practices and Organizational Innovation: Role of Knowledge Management Effectiveness - Mr. Deepak Burud; Smt. Sheetal R Kamble	EISBPM013	82
14	A Study Of Effective Hrm Practices In Hospitals For Better Administration For Ahmednagar District- Prof.Sandeep J. Sonawane	EISBPM014	89
15	A Study On Nap Timing At Workplace & It's Effect On Workers- Prof. Dr.Gadhe D. P.	EISBPM015	92
16	E-Waste :It's Components And Impact On Environment- Mayuri B.Dandwate, RutujaV.Kotkar,	EISBPM016	96
17	Green Banking: Challenges & Opportunities- Prof. Pramod D. Borhade,	EISBPM017	101
18	Stock Market Rejoinder Towards Digital India Budge - Prof P.S.Kawale,Dr A R Jaswal,	EISBPM018	107
19	Strategic technological integration: A key for Sustainable Development - Mr.Satish V. Bidgar, Dr.Vinod R. Malkar	EISBPM019	110
20	Rural Development through Agri-preneurship- Opportunities and Challenges - Malkar Vinod Ramchandra, Shinde Kiran Shantaram ,	EISBPM020	113
21	A Study on Problems, Confrontation and empowerment Of Farmers towards Pomegranate Cultivation - Prof. Yogesh. L. Aher, Dr.MitalS. Bhayani,	EISBPM021	118
22	Extended Marketing Mix in Private Hospitals: A Literature Review - Dr.Gaikwad Rupendra Ramchandra' Mr.NN.Dighe,	EISBPM022	124

23	A Study of Augmented Reality for Data Booth- Rutuja V. Kotkar, Mayuri B. Dandwate,	EISBPM023	131
24	Study of Indian Telecom Industry after Entering Jio - Shinde Kiran Shantaram; Malkar Vinod Ramchandra	EISBPM024	136
25	A Study of Supply Side Issues Leading to Sustainability of Mutual Funds - Dr. M.S. Bhayani, Prof. Y.L Aher	EISBPM025	143
26	Hospital Information System- An Exploratory Analysis- Mr. Nitin S Bhand, Dr. Avinash Ganbote,	EISBPM026	149
27	Analysis and Business Strategy for Electric Vehicle (EV) Mr. Parag Metha, Mr. Pushkar Metha, Dr. Rajesh Paturkar	EISBPM027	152
28	Emerging Scope of Bancassurance in Banking & Insurance Sectors - Shuchi Gautam, Navin Bhatt,	EISBPM028	162

ENGINEERING PAPERS

SR.NO	TITLE - AUTHOR	PAPER ID	Page. Nos
29	Short Term Power Demand Forecasting - Sandip Ashok Shivarkar, Vikas N. Nirgude	EISBPE001	167
30	Influence of Shoulder Diameter of Tool in FSW on Tensile Strength of Aluminium Alloy 6082 T6 S.A. Thorat, Dr. A.G. Thakur,	EISBPE002	171
31	Analysis of the DS CDMA system with BER and SNR parameters for Rayleigh and Nakagami-m fading channel. Rajendrakumar Govinda Zope, Dr. Devendra N. Kyatanavar.	EISBPE003	179
32	Digital Watermarking Prof. P.B. Khatkale, Dr. A. B. Pawar	EISBPE004	187
33	A Survey for Minimizing the Communication Latency in Multicore Architecture Anilkumar Vishwanath Brahmane	EISBPE005	191
34	Assessment of Groundwater Pollution due to conventional on-site Sanitation Systems Vanita S. Pote, Vishwajit B. Kokate	EISBPE006	202
35	Application of Artificial Neural Network for the Problem of RSSI Based Target Tracking in Wireless Sensor Networks Satish R. Jondhale, Dr. R. S. Deshpande	EISBPE007	208
36	ECONOMICAL ROAD DIVIDER AND NATURAL FENCE- Pradnya Vasant Kadam	EISBPE008	213
37	Comparison of Bolted and Bonded Joints in a Composites- A Review- P. A. Ugale, K. C. Bhosale	EISBPE009	216
38	A review on enhancement of tool properties through various treatments and surface coatings M. S. Devdhe, S. V. Bhaskar	EISBPE010	224
39	Precision Agriculture Using WSN Node D. S. Salve, Prof. N.Y. Siddiqui	EISBPE011	230
40	Crime against Woman Analysis, Visualization and Prediction Sameer Shaikh,	EISBPE012	236
41	Noise Pollution: Present Scenario of Kopergaon City Mr. Mukunda Bhor, Prof. V.S. Chaudhari, Dr. M.V. Jadhav	EISBPE013	245
42	Mining Social Media Data for Understanding Learning Experiences of Engineering Students - N.G. Pardeshi,	EISBPE014	250

43	Blockchain: Overview and Applications Mr. Ganesh B. Gadekar, Mr. Chaitanya P. Chandgude	EISBPE015	254
44	A REVIEW ON VEDIC MULTIPLIER IN VLSI M. A. Sayyad, D. N. Kyatanavar,	EISBPE016	259
45	Effect of Preheated Palm Biodiesel on Performance and Emission of Diesel Engine Sumedh S. Ingle, Kalpana G. Joshi, S. B. Bajaj	EISBPE017	265
46	SIMULINK MODEL OF QUARTER CAR AND IT'S EXPERIMENTATION ON SUSPENSION TEST RIG Jaydeep B. Ashtekar, Dr. Ajay G. Thakur, Yogesh S. Dighe	EISBPE018	270
47	A New Approach of Vehicle Number Plate Recognition Using Template Matching and Neural Network as Hybrid Method.- Mr. H. E. Khodke, Mr. S. R. Deshmukh	EISBPE019	277
48	Clustering based Energy Efficient Routing Algorithm for Wireless Sensor Network N Y Siddiqui, A K Kureshi,	EISBPE020	283
49	Food Price Crises Understanding Based on Indian Tweets Data Analysis Dr. Madhuri A. Jawale, Dr. Devendra N. Kyatanavar, Dr. Anil B. Pawar	EISBPE021	288
50	Food Security Assessment using Big Data Analytic Dr. Anil B. Pawar, Dr. Devendra N. Kyatanavar, Dr. Madhuri A. Jawale	EISBPE022	292
51	Image Mosaicking using Harris Corner Detection Miss. Mayuri G. Rane ¹ , Prof. Dr. B. S. Agarkar ²	EISBPE023	297
52	SCMH : Cross Media Retrieval Miss. Mayuri D. Pawar, Prof. S. S. Deore	EISBPE024	301
53	Ontology Based Approach for Project Proposal Selection Using Text Mining Approach. Mr. S. N Gunjal, Mr. B. J Dange, Mr. A. V Brahamane	EISBPE025	304
54	MICROBIAL FUEL CELL TECHNOLOGY FOR WASTEWATER TREATMENT AND ELECTRICITY GENERATION A. R. GAIKWAD, M. V. JADHAV	EISBPE026	311

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Kopergaon, Dist - Ahmednagar, Maharashtra, India**

India’s CSR journey and its trends in India till 2017

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Abstract: Today CSR requires key mediation because of effect it is relied upon to make. Increment in CSR spends and scale has made it considerably more critical for organizations to precisely take a gander at CSR plan and conveyance. CSR around the globe takes after 4 approaches, which could be classifications as Link to Business, Delink from Business, Address countries squeezing issues or address the nearby group needs. The most well-known now in India is Link to Business, which enables organizations to coordinate CSR as a major aspect of its business procedure and present a win-win circumstance at the two finishes. This approach speeds up centered social advancement, makes more grounded money related execution and higher comprehension of social and natural measurements of an organization's execution. Subsequently help construct successful organization, incorporate and advance inventory network, set up an organization as business of decision and enhance association with its partners to saddle open discourse with straightforwardness. Today organization's money related execution has coordinate impact on its social value and this procedure is more genuine and even minded
In India the approach towards CSR changed. The mechanical groups of the nineteenth century, for example, Tata, Godrej, Bajaj, Modi, Birla and Singhanian were emphatically disposed towards monetary and additionally social advancements. Culture, religion, family esteems, convention and industrialization were they key influencers of CSR. It was watched that endeavors towards social and additionally mechanical improvement were driven by magnanimous and religious intentions as well as impacted by political targets
Post-autonomy amid 1960 to 1980 the component of "blended economy", rise of Public Sector Undertakings (PSUs) and laws relating work and ecological guidelines picked up significance. Amid this period the private division was compelled to assume a lower priority. General society part was viewed as the prime mover of advancement. As a result of the stringent legitimate standards and directions encompassing the exercises of the private segment, the period was depicted as a "time of summon and control".

Key Words: CSR, Organizations, Monetary and Enhancement

1. INTRODUCTION:

CSR history and its transition

“CSR began as Philanthropy. In the pre-industrialization time up to 1850, a dealer helped he general public in getting over periods of need and ascends by giving sustenance and cash and in this manner securing a necessary position in the general public”.

With the landing of pilgrim control in India the approach towards CSR changed. The mechanical groups of the nineteenth century, for example, Tata, Godrej, Bajaj, Modi, Birla and Singhanian were unequivocally disposed towards monetary and also social advancements. Culture, religion, family esteems, convention and industrialization were they key influencers of CSR. It was watched that endeavors towards social and additionally modern advancement were driven by benevolent and religious thought processes as well as affected by political destinations.

1.1 Pre-Independence

With the entry of pioneer govern in India the approach towards CSR changed. The mechanical groups of the nineteenth century, for example, Tata, Godrej, Bajaj, Modi, Birla and Singhanian were emphatically disposed towards monetary and additionally social advancements. Culture, religion, family esteems, convention and industrialization were they key influencers of CSR. It was watched that endeavors towards social and additionally mechanical improvement were driven by magnanimous and religious intentions as well as impacted by political targets.

Amid the autonomy development, there was expanded weight on Indian Industrialists to exhibit their commitment towards the advance of the general public. Mahatma Gandhi presented the thought of "trusteeship", as indicated by which the business pioneers needed to deal with their riches in order to profit the basic man. "I want to end free enterprise nearly, if not exactly, as much as the most developed communist. Be that as it may, our techniques vary. My hypothesis of trusteeship is no make-move, unquestionably no disguise. I am certain that it will survive every single other hypothesis." Gandhi's impact put weight on different Industrialists to act towards building the country through financial advancement. As indicated by Gandhi, Indian organizations should be the "sanctuaries of present day India". Under his impact organizations set up trusts for schools, universities, healing centers and furthermore helped in setting up preparing and logical foundations. The operations of the trusts were to a great extent in accordance with Gandhi's changes which tried to abrogate untouchability, energize strengthening of ladies and country improvement.

1.2 Post-Independence

Post-autonomy amid 1960 to 1980 the component of "blended economy", rise of Public Sector Undertakings (PSUs) and laws relating work and ecological guidelines picked up significance. Amid this period the private division was compelled to assume a lower priority. General society part was viewed as the prime mover of advancement. As a result of the stringent legitimate standards and directions encompassing the exercises of the private segment, the period was depicted as a "time of summon and control". The strategy of mechanical permitting, high duties and confinements on the private division prompted corporate misbehaviors which prompt institution of enactment in regards to corporate administration, work and natural issues. PSUs were set up by the state to guarantee reasonable dispersion of assets (riches, sustenance and so on.) to the destitute, yet this was compelling just to a specific degree. Desires from the private division climbed again and their dynamic association in the financial improvement of the nation turned out to be completely vital. In 1965 Indian academicians, government officials and representatives set up a national workshop on CSR went for compromise. They accentuated upon straightforwardness, social responsibility and standard partner exchanges. Notwithstanding such endeavors CSR neglected to get steam.

1.3 During Industrialization

Amid fast industrialization in 1980 Indian organizations began forsaking their customary engagement with CSR and incorporated it into a maintainable business procedure. In 1990s the main start towards globalization and financial advancement were attempted. Controls and authorizing framework were halfway discarded which gave a lift to the economy the indications of which are exceptionally apparent today. Expanded development force of the economy helped Indian organizations develop quickly and this made them all the more ready and ready to contribute towards social reason. Globalization has changed India into an imperative goal as far as generation, assembling and advertising. The abroad markets were winding up increasingly worried about work and natural gauges in the creating nations. Indian organizations who were into delivering products for the created nations expected to give careful consideration to consistence with the worldwide benchmarks. The fundamental goal of social duty was to boost the organization's general effect on the general public and partners. CSR strategies, practices and projects were in effect exhaustively incorporated by organizations all through their business operations and procedures. A developing number of organizations felt that economy helped Indian organizations develop quickly yet it was vital for securing the altruism and notoriety to build business aggressiveness.

2. OBJECTIVES:

- To study the status of Corporate social responsibility pre and post-independence
- To study the current status of CSR in India

3. RESEARCH METHODOLOGY:

This research is based on surveys and fact finding enquiries; hence it falls under the descriptive type of research. It involves analyzing and interpreting the influence of CSR hence it also falls under analytical type of research. This research mainly focuses on studying whether CSR are influencing on the company in a positive or negative way hence it also falls under quantitative type of research.

The research requires primary and secondary data before heading to further steps.

The primary data was collected by analyzing views about CSR and extent of its influence on them using certain parameters. The secondary data was collected by reviewing the literature from the related or similar researches that were carried out previously Government understanding the significance of Corporate India in social improvement.

The Companies Act 1956 was patched up with the New Companies Act 2013, the Act of Parliament got the consent of the President on the 29th August, 2013. The New Companies Act 2013 has likewise presented another Section on Corporate Social Responsibility (CSR), Section 135, making CSR compulsory for all Companies working in India, with a qualified rule in view of their funds. The basis is basic each organization having net benefit or benefit before impose (PBT) of Rs 5 crores or more, total assets of Rs 500 crores or more, or turnover of Rs 1,000 crores or all the more, amid any money related year should constitute a Corporate Social Responsibility Committee on the Board, comprising of at least three chiefs, out of which no less than one executive might be an autonomous chief. The tenets further say that CSR isn't philanthropy or unimportant gifts. The organizations should utilize CSR to coordinate financial, ecological and social destinations with the organization's operations and its development. The CSR council should detail its CSR arrangement, in light of which exercises and particular spending plan would be assigned. The projects actualized would be checked and revealed through organization's site and yearly report. 2% CSR spending would be processed as 2% of the normal net benefits made by the organization amid the first three monetary years. Organizations need to do and report their CSR activities for the money related year 2014 – 2015 thus the evaluation year would be 2015 – 2016. The revealing or administration is straightforward "State what you will do, report what you did".

3.1 Developing need to procedures CSR

Today CSR requires key mediation because of effect it is relied upon to make. Increment in CSR spends and scale has made it considerably more critical for organizations to precisely take a gander at CSR plan and conveyance. CSR around the globe takes after 4 approaches, which could be classifications as Link to Business, Delink from Business, Address countries squeezing issues or address the nearby group needs. The most well-known now in India is Link to Business, which enables organizations to coordinate CSR as a major aspect of its business procedure and present a win-win circumstance at the two finishes. This approach speeds up centered social advancement, makes more grounded money related execution and higher comprehension of social and natural measurements of an organization's execution. Subsequently help construct successful organization, incorporate and advance inventory network, set up an organization as business of decision and enhance association with its partners to saddle open discourse with straightforwardness. Today organization's money related execution has coordinate impact on its social value and this procedure is more genuine and even minded. Adjusting one's activities are exceptionally critical for survival and powerful development "what got you here won't get you there" (book title composed by Marshall Goldsmith)

Organizations are building specific CSR groups to define arrangements, techniques, objectives and spending plan. Topics and projects are regularly controlled by qualities, logic and approaches of the organization. Minor projects of representative's engagement won't be sufficient to satisfy an organization's CSR responsibility; it would require consistent and organized mediations.

3.2 Significance of coordinating social and Organizational esteems

CSR experts need to adjust and perceive the connections between the general public welfare and the accomplishment of the association. They have to look at the open doors which ought to be intended to profit the association and additionally the group, now and in future. To fabricate a more grounded responsibility it is vital to incorporate CSR into key business territories, by distinguishing and dealing with the positive and negative effect of business exercises on the general public.

On the off chance that an organization needs to coordinate and drive CSR all through the association, it needs to adjust its social duty techniques and objectives with hierarchical goals. This will insert CSR inside the business culture to maintain the methodology over the long haul.

It is essential to assess potential and complex effects because of social and conditions activities before contributing. This will help construct a reasonable activity design and maintain a strategic distance from deviation. Recognizing current vulnerabilities and foresee future entanglements identified with business practices would be valuable to distinguish your center CSR topic zones.

A CSR approach can help enhance corporate administration, straightforwardness, responsibility and moral principles. Organizations are worldwide representatives of progress and qualities. Innovation offers chances to enhance discourse and associations. Customers and financial specialists are indicating expanding enthusiasm for supporting capable business rehearses and are requesting more data on how organizations are tending to dangers and openings identified with social and ecological issues.

Individuals in numerous nations are influencing it to clear that organizations should meet similar exclusive expectations of social and ecological care, regardless of where they work. In the meantime, there is expanding consciousness of the cutoff points of government administrative and administrative activities to viably catch every one of the issues that CSR address. Organizations perceive that embracing a successful way to deal with CSR can decrease the danger of business disturbances, open up new open doors, drive advancement and upgrade mark.

3.3 CSR patterns for India in 2017

Today, the essential goal of CSR is to boost the organization's general effect on the general public and on the partners. An expanding number of organizations are exhaustively incorporating CSR approaches, practices and projects all through their business operations and procedures. CSR is seen not simply one more type of circuitous cost but rather an essential apparatus for securing and upgrading the altruism, shielding assaults and expanding intensity.

Organizations have expressed having particular CSR groups that define systems, strategies and objectives for their CSR programs and incorporate into their financial plans to subsidize them. These projects are controlled by social logic and have clear targets. Likewise, they are lined up with the standard business. These CSR programs are executed by the workers urgent to the procedure. CSR programs run from group advancement to improvement in condition, training and human services and so forth.

For example, organizations, for example, Bharat Petroleum Corporation Limited, Hindustan Unilever Limited and Maruti Suzuki India Limited have embraced a more far reaching technique for advancement. Building schools and houses and engaging the villagers, arrangement of enhanced therapeutic and sanitation offices, making them independent by giving professional preparing and information of business operations are the offices centered around by these partnerships.

Then again, companies like GlaxoSmithKline Pharmaceuticals' emphasis on wellbeing related parts of the group through their CSR programs. They set up wellbeing camps in remote inborn towns offering therapeutic registration and treatment and furthermore attempt wellbeing mindfulness programs.

These days, corporates are holding hands with different NGOs and utilize their aptitude in contriving compelling CSR projects to address more extensive societal issues. In India, the CSR multi-partner approach is divided. Connection amongst business and common social orders, particularly exchange unions, is as yet uncommon, generally occurring on an impromptu premise. The comprehension of CSR in India is as yet not specifically connected to the multi-partner approach.

A couple of organizations in India that have effectively coordinated manageability into their business forms are talked about underneath.

2016 started with huge reckoning as the Paris understanding had been agreed upon. While 2017 has not begun with that quite a bit of a huge explosion there is trust that the point of interest occasion of India confirming the Paris accord in 2016 will get the genuinely necessary increasing speed to India's manageability travel .The pattern of speculators, customers and governments requiring more noteworthy straightforwardness from the private division is just the same old thing new, however today, business are getting to be plainly proactive and attempting to de-hazard themselves from charges of carelessness. Dangers to organizations are originating from all headings. On one side are ecological factors, for example, nonattendance of water or key materials that influence generation. On the opposite side social factors, for example, human

rights, liveable wages, working conditions, financial imbalance and different issues are raising their head. Therefore, social and natural issues, once observed as discrete, are meeting up inside a few organizations.

The coming year will show an open door for organizations to adjust endeavors around intergovernmental activities, for example, COP21. Furthermore, systems, for example, the Sustainable Development Goals (SDGs) will put expanding weight around certain objectives.

3.4 Here are some manageability patterns to pay special mind to in 2017.

3.4.1 The push for a cleaner situation

At the point when the Swachh Bharat Abhiyaan was propelled 3 years back, many saw it with distrust. Regardless of whether it can be esteemed a win or not, nobody truly knows right now, but rather one thing is without a doubt, it has expedited the talk neatness to the standard. 39% of organizations we considered have assigned assets to this battle and manufactured toilets or aided in tidying up of open spaces. Significant daily papers now designate space to the need to assemble open toilets, rubbish consuming, littered streets and even expansive open occasions that reason natural harm and foulness. To some extent, this has additionally been driven by bigger open mindfulness because of wellbeing perils of water and air contamination

3.4.2 CSR as strategy and not charity

Corporate India is finally realising that the short term approach of writing a cheque for the CEO's favorite charity is not prudent any more. Since CSR investments need appropriate disclosure and need to be done every year 2016 saw many companies holding back CSR funds if they didn't find appropriate projects. Less than 4% of CSR funds spent by top Indian corporates was given as charity as per our study. Companies are now looking at methods to add strategic brand value through these investments even if these are not directly related to the business they are in, as required by law.

2017 will see companies asking NGOs for stringent reporting on existing projects and pooling of resources amongst top corporates to build greater impact.

3.4.3 Zero impact moves to net positive

Most companies are moving towards creating sustainable growth models in different ways. As manufacturing companies explore the interlinkages of supply chains it is evident that waste, water, energy and materials are closely linked to business continuity. There is a growing realization that growth without adversely impacting the environment is now an expected goal. Forward looking companies like Ambuja Cement, ITC, DalmiaBharat , etc., are talking of being water positive several times over.

2017 will see more companies building deeper corporate sustainability strategies which will seek to external impacts and not just mitigate internal impacts.

3.4.4 Water begins to take center stage

Droughts and water shortages in one area and extreme floods in other parts were part of the ongoing discourse around Indian cities and villages in 2016. Companies have had to increasingly gear up to the challenges this has posed. From stopping operations and facing large scale damage in flooded areas to sourcing water trucks for employees and regular manufacturing operations, water is now becoming a significant risk factor. Water is now one of the highest global risks, according to the ninth edition of the Global Risk Report, released in early 2014 by the World Economic Forum. Corporate sustainability reports, are now speaking of water at two levels – as part of CSR initiatives for communities and as part of company operations.

2017 will bring more discussions and corporate initiatives around water management, measurement and above all water valuation

3.4.5 Renewables gather momentum

With the Paris accord in play, companies will need to pitch in, in a significant manner for India to achieve the NDC (nationally determined commitment) of emission cuts by 33-35%. Hence it is expected that companies would focus more and more on renewables with a strong focus on solar, biofuels and wind. Off the grid energy systems are likely to provide succour to remote areas, which remain deprived of electricity supply. This is likely to gain strength with developments in energy storage. Improved storage will also help corporations move towards renewable energy for their own consumption.

Corporations will increasingly engage with the government in policy making and contribute towards an effective public-private partnership on renewables.

4. CONCLUSION:

There is huge and drastic difference between the initial era and the latest trends in the Corporate Social Responsibility. In earlier days the CSR is limited with the some organizations only but now a days it is has been implemented by most of the companies.

The best part of the CSR implementation that the beneficiaries and the employer both are getting the benefits. Because of Government compulsion the companies are doing the various activities and the effect of these activates are seen in rural as well as urban area.

Because of the change in time the trends also changes and we can observe the variation in the activities and campaign. So overall there is change in CSR.

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Horticulture: A Strategic Source of Jammu and Kashmir Economy

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Abstract: *The Jammu and Kashmir State is well known for its horticultural produce both in India and overseas. It offers good scope for cultivation of horticultural products, covering different variety of temperate fruits like apple, peach, plum, pear, apricot, cherry, almond and sub-tropical fruits like guava, mango, citrus litchi and phalsa. Besides, pharmaceutical and aromatic plants, mushroom, floriculture, plantation crops and vegetables are cultivated in the state. The famous spices like saffron and black Zeera are also cultivated in some pockets of the state. The objective of the study is to know the impact of horticulture sector in Jammu and Kashmir economy and secondary data was used for data collection. The study conclude that horticulture plays a very prominent role for development of economy of J&K State. It contributes around 27% to the J&K state's economy. Almost 70% of its population is dependent on horticulture and about 49% of the working class is engaged in it.*

Key Words: *Horticultural, Economic Development, Jammu and Kashmir.*

1. INTRODUCTION:

By Sir Walter Lawrence, the European settlement official of former Maharaja of Kashmir “Kashmir is the country of fruits, and possibly no country has greater atmosphere for horticulture; as indigenous apple, pear, vine, mulberry, walnut, hazel, peach, apricot, raspberry, gooseberry, currant, and strawberry can come into ownership without much trouble in most parts of the valley”. If we examine the sector now as almost 100 years have gone by, that description begs a number of questions. The state of Jammu & Kashmir is home to some world famous varieties of fruits, dry fruits, honey and saffron. Horticulture is one of the most animated sectors for the state economy. This sector is backbone of Jammu Kashmir’s economy with a yearly income of Rs.1200 Crores. It offers direct and indirect employment to about 23 lakh people and has possible for further growth. Keeping this in view the state government has declared it a thrust area and is taking a number of steps to improvement it.

Horticulture is mixture of two Latin words “Hortus” means garden and “cultura” meaning cultivation thus horticulture literally means culture of garden crops. Jammu and Kashmir State, is famous for its horticulture produce. The State economy is largely agrarian-based, and more than 60% of the population is involved in this sector. Production of about 20 lac metric ton (mt) of fruits finds marketability in the whole country as well as foreign destinations. Among all fruits, apple comprises of major share (82%). The estimated merchantable surplus (2011-12) of grade A and B apple is approximately 12 lac mt. Extra grade C apple available for processing is 3.22 lac mt, of which, about 30,000 mt of grade C and discarded apples are being processed into apple concentrate by dispensation plants in Kashmir region. Small amount of apple is also handled into other products, like, jam, jelly and apple preserve. Of late, the share of Kashmir apple arriving in Delhi market has deteriorated to 42.63% during 2011-12 from 70% ten years back. During the first few five year plans, importance was assigned to achieve self-sufficiency in food grains production. Over the years, horticulture emerged one of the significant and rising sub sector of agriculture, contribution a wide range of selections to the farmers for crop diversification. It also provides sufficient opportunities for supporting large number of agro industries which produce considerable employment opportunities. With agriculture and allied sectors finding different ways of increasing productivity of harvests, horticulture as a sub-sector, is a expose, showing extra ordinary signs of progress in the state.

2. REVIEW OF LITERATURE:

- **Baba and Wani (2009)**, mentioned that horticulture is labor intensive and it requires net high labor ratio from the stage of establishing to stage of promotion of production. The sector also needs lot of provision from family associates and allows them to earn income, also offers indirect employment in packing, grading, categorization and dispensation activities especially in horticulture belts. Agriculture in India is a introduction to economic development and a pre-requisite for poverty alleviation and economic development.
- **Malik (2013)**, primary sector is the pillar of Indian economy and Horticulture is a crucial Section, the production of apple is the main develop a commercial crop, which produced to sell in the market. Though there have been multidimensional efforts for production of apple in Jammu and Kashmir, but apple marketing has not received proper attention, also ignorance from government side, lack research and development and infrastructure leads to negative effects. The Study high lights the proportions of supply chain management of apples in the Kashmir Valley.
- **Bhat and Choure (2014)** cultivation of Apple is highly profitable economic activity in the Jammu and Kashmir state, which is famous for its superiority. It is farm based, labor generating and commercially attractive economic activity. The income per acre gained by cultivation of Apple is much higher than any other crops. Apple production plays an important role in improving the living standard, revenue and employment generation. Almost More than half population is involved in the farming of apple directly or indirectly in Jammu and Kashmir. Improvement in production process is pretty high, but also marketing has equal chance to develop a commercial crop. It has been found that the agriculturalists face numerous difficulties like storage facilities, marketing, good quality pesticides etc. which contributes low production. It has been suggested that if these facilities are providing sufficiently, productivity could be improved just like in China.
- **ZulfiqarMurtaza (2015)**, the researcher draws attention towards about the fact that the horticulture sector in the Jammu and Kashmir valley has lost its pride and glory. Kashmir was once home of high quality fruits and the industry was flourishing, helping not only generate employment but also in driving the economy. The researcher used an empirical study and is one of the first of its kind. The research uses statistical tests chi-square test) to show what are the factors which are responsible for a fall in the horticulture sector. The paper also uses percentage analysis and rank analysis to come to conclusion.
- **Rajesheri and Ali (2016)**, Horticulture is very significant position in the mainly agricultural economy of western Himalaya, among maximum fruits grown in the Kashmir. This sector contributes hugely to strengthen the financial condition of Jammu and Kashmir. Horticulture sector is the backbone of the economy with 2.3 million people associated with the sector and 237000 hectares of land in Kashmir valley under fruit cultivation. This is an essential sector of Jammu and Kashmir agriculture. Around twenty per cent of area of the state is under horticultural crops. Almost around 5000 crores to the annual income of the state of Jammu and Kashmir from horticulture sector. Among the horticultural yields, apple occupies the main place creating around 45 per cent of the total area. Horticulture contributes meaningfully to the employment generation, economic and ecological development, export and nutritional requirement of the people of state. Apples are most widely established and commercially the most important fruit crop. Apples cultivation in Jammu and Kashmir shows specific interest for a number of reasons. In terms of both area and production, it is very helpful fruit crop. Apple is an extremely important source of nutritious diet, this provides a major source of income and employment of people in Jammu and Kashmir.

3. OBJECTIVE:

- To examine the impact of horticulture sector on economy of Jammu and Kashmir.

4. METHODOLOGY:

This study carried out is analytical and empirical in nature. The study is based on published sources of data collected from various reports and publications of Government of India, Directorate of Horticulture Planning and

marketing Jammu and Kashmir, National Horticulture Database, Directorate of Economics and Statistics J&K sources. Further various published research papers and reports of State and Central Govt.

5. PRODUCTION AND AREA UNDER HORTICULTURE:

In Jammu and Kashmir State especially in Kashmir Division, horticulture plays a significant role in contributing to the economy of the state. As per estimates, over 6 lac families are actively involved horticulture sector. This sector is one of the most important employment generating sectors in the state. Year after year, there is a significant increase in area and production under horticulture crops. The continuous increase in production and productivity can be attributed to modal factors like commitment of the farmers/orchardists towards this sector, continuous efforts of the Department of Horticulture and Research Organization and above all the conducive agro-climatic conditions of the State. If we look at the data of area and production for the last ten years,

It would be observed that there has been a continuous increase in trend both in production as well as in area. A comparison of the area & production can be made with the help of following tables/figures:-

TABLE NO .1.I

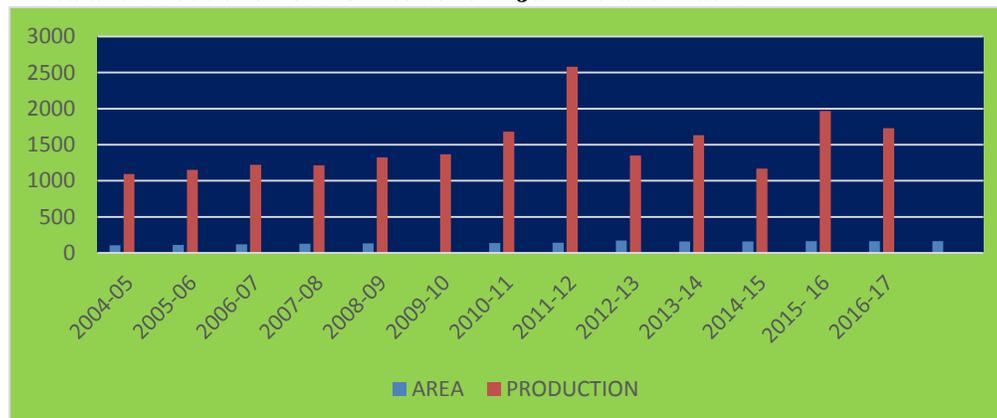
YEAR	AREA IN HACTARES (000)	PRODUCTION IN (000) METRIC TONS.	PRODUCTIVITY MT/ HCT.
2004-05	107.93	1093.33	10.12
2005-06	111.88	1151.34	10.12
2006-07	119.04	1222.18	10.26
2007-08	127.80	1211.85	10.26
2008-09	133.10	1322.81	10.01
2009-10	139.04	1367.80	9.84
2010-11	141.72	1680	11.86
2011-12	170.60	2581.18	15.13
2012-13	157.28	1348	8.58
2013-14	161.37	1633.35	10.12
2014-15	163.43	1170.30	7.16
2015- 16	161.77	1966.41	12.16
2016-17	162.97	1726.83	10.6

Increasing production and productivity of Horticulture crops in Jammu and Kashmir

Source: Directorate of horticulture Jammu and Kashmir

Chart 1

Representation of Area and Production of Horticulture in Jammu and Kashmir



Source: Directorate of horticulture Jammu and Kashmir There was nonstop progress of area under apple cultivation in Jammu and Kashmir from 107.93 (000) hectares in 2004-05 to 163.43 (000) hectares in 2015-16. The main motive for the increasing tendency was mainly relative advantage of this crop over the other commercial crops grown in high elevation region in the state. During 2004-05 the production was worth 1093.33(000) metric tons. The production marked uppermost growth during 2011-12 worth 2581.18(000) metric tons. But the production diminished during 2012-13 because due to premature rainfalls in the state. The overall production of apple for the year 2013-14 and 2014-15 was worth 1633.35(000) MTs 1170(000) MTs , 2015-16 and 2016-17 was worth 1966.41(000) MTs, 1726.83(000) MTs respectively as there has been some damage to the Horticulture crop due to low temperature and due to unforeseen rains followed by flood in some areas of the State.

Chart 2

Graphical representation of Horticulture productivity in Jammu and Kashmir



Source: Directorate of horticulture Jammu and Kashmir

The Jammu and Kashmir state has the major potential for production of superiority temperate horticulture crops. It has created position production of apple, pear, cherry and dry fruits. Among temperature fruits apple ranks top position in terms of productivity. The yearly production of apple in the state is about 9.09 lack ton at an average yield of 10.09 ton per hectare. However the production & productivity of this crop has been changing during 2004-05 to 2009-10, due to some other climatic conditions. In spite of this apple production and productivity enlarged during the year 2010-11 and 2011-12 and marked uppermost as 11.86 and 15.13 Metric ton per hectare respectively.

Export of Fruits

Export of fruit from outside State, has occupied a prominent place in trade of the State. The export of fresh fruits increases more and more but, export of dry fruits slowly decrease. In Jammu and Kashmir the export of fresh fruits increased from 10.54 (LMT) in 2011-12 to 14.58 (LMT) in 2015-16. On the other hand, the volume of export of walnut has decreased to 0.14 (LMT) in 2015-16 from 0.19 in 2011-12.

Table No 1.II

Export of fruit outside the State (lakh Metric tonnes)

Year	Fruits (Apple (95%), pear, cherry, apricot, peach. (in LMT)	Walnuts.(in LMT)
2011-12	10.54	0.19
2012-13	11.76	0.18
2013-14	11.92	0.18
2014-15	12.55	0.15
2015-16	14.58	0.14

Source: Directorate of horticulture Jammu and Kashmir

6. CONCLUSION:

The horticulture sector in Jammu and Kashmir has declared as main thrust area for overall growth. The income per acre is much higher than any agriculture crops, if it is done in systematic way. Horticulture production plays an

important role in improving the standard of living, per capita income and employment generation. More than half percentage of the population is engaged in the cultivation of horticulture directly or indirectly in the state. Apple being state's main fruit has predominant position both in area under plantation and production. Apart from its profitability criteria the corporation will bring the horticulture industry of Jammu and Kashmir to an appreciable standard by the introduction of latest technological devices. The area under horticulture crops are increased day by day. But the production of dry fruits decreased in Jammu and Kashmir.

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**‘Sanjyot-2018’ National Seminar on
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Recruitment and Selection Process at Kinetic Engineering Limited

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Abstract: Since from Ancient era the trade, industrial houses are more focused on the human capital because they are the most esteemed and utmost precious assets. At the time of recruitment & Selection of applicants the organizations has to plan for sensibly the existing human resources because they create the competitive advantage for the organizations. The word recruitment has developed as a life line of human resource capital for the determined organizations. Business operations running in today's 21st century & globalized world are progressing in modern recruitment and selection approaches due to the entry of multinational companies. The aim of the paper is to study the recruitment and selection process followed at Kinetic Engineering Limited. The best human capital accessibility in organizations makes them aggressive and as well as they become the real life blood of the organizations. This research studies the review of literature for recruitment and selection procedures followed at organizations. The research was done using both primary and secondary data. Primary data was collected from employees, by using questionnaire method. The results were obtained from percentage method. The research findings reveal that at Kinetic Engineering Limited follows best recruitment and selection process and they are satisfied with the organizational climate and the organization follows ethical recruitment policy.

Key Words: recruitment policy, selection, ethical values, employees, organization climate.

1. INTRODUCTION:

Human resource management is the essential function of organizations. Among the Practices recruitment is the basic function where employees are ingress into the organizations. Recruitment is the process of searching prospective employees to apply for the job posting in the Kinetic Engineering Limited. Selection is the process of choosing an appropriate candidate among the job applicants. Selection process starts after the completion of the recruitment process. Recruitment is the positive aspect whereas selection is the negative aspect of Practices. Many of the researchers say that recruitment and selection policies should be ethical for the organizations in order to sustain in the competitive environment. Recruitment is the first step then after selection and placement comes in the employment process (Rao, 2010). Employers aim is to choose an appropriate candidate suitable for that particular job. Recruitment is the activity done by the HR's in many organizations. The recruitment process differs from one organization to others. According to Edwin B. Flippo recruitment is the process of attracting the candidates and making them to apply for the job. Recruitment process followed at many Indian organizations is by framing the recruitment policy and then making the policy into action. Sources of the traditional recruitment are by employee referrals, transfers and promotions, walk-in and by the advertisements. In the modern economy the recruitment process was drastically changed with the entry of social media. There are many factors that affect recruitment process like organization culture, working hours, facilities, salary, welfare, brand image, good will, location and etc. Selection is the second step in the in the process of man power planning. Selection is the process of choosing the appropriate candidate which matches the candidate skills and the job requirements (Bhattacharyya, 2010). Selection process will be long-lasting for large organizations and will be wider for manufacturing organizations and it differs from one industry to other (Venkatesh, 2008). As this a manufacturing organization its process will be wider in departments and activities. According to the Dale Yoder selection means dividing the total job applicants

into two classes as selected and not selected (K.Aswhathapa, 2007). There are many factors that are to be considered while selecting a candidate those are like group discussions, employment background, referral background, interviews, medical tests and etc.

2. REVIEW OF LITERATURE:

According to the Burack (1985) recruitment sources are closely linked to the organizational activities as performance of employees, employee turnover, employee satisfaction, employee wishes and the commitment of the organization (Burack, 1980). These recruitment and selection processes should be done at each and every sector for fulfilling their organizational goals (Nartey, 2012). Recruitment and selection practices were important in the police department as said by Michael D. White and Gipsy Escobar (2008) in the world and this paper shows the importance of seven issues relating to recruitment, selection and training practices in the organizations (M.N.Malhotra, 2014) (Terpstra.D, 1996). Mohammed NurulAbsar (2012) says the importance of recruitment and selection in his paper by considering both public and private manufacturing firms in Bangladesh (M.M.Absar, 2012). Some of their search professionals and scholars say that there is a close linkage between the recruitment selection employee satisfaction organization performance and HR practices (Gorter, 1996). In his paper Recruitment and Selection of public workers: An international compendium of modern trends and practices say that the importance of using technology in the recruitment and selection process for updating the organizational resources (Hays, 2004). Ongori Henry and Temtime Z (2009) say that in their paper the recruitment and selection practices of the small and medium enterprises and make them to improve their HR practices (R.D.Omolo, 2012). French says that the importance of certain selection and recruitment activities in the organizations (G.R.French, 2012). Among recruitment sources Bernardin say that internal source of recruitment is effective compared to the external source (John, 2003). Decker & Cornelius say that compared to the traditional recruiting sources the modern sources like referrals, casual applicants and direct approaches will benefit at large (L.Barclay,1985) (Cappelli, 2001). Selection procedure also should be in application to the modern techniques (M.Smith, 2001). The literature says that employers are doing the traditional method of recruiting rather than the modern technologies (Schmidt, 1998). Chris Piotrowski and Terry Armstrong says that in their article that around all the organizations are using traditional recruitment sources and 30% of organizations are screening candidates honestly (Armstrong, 2006). According to SHRM (Society for Human Resource Management) says that 15% joined in the organizations are placing false resume (Gusdorf, 2008). Some of the employers select the candidates with discrimination was not supposed to be done in the organizations (Fomunjong, 2009).

3. OBJECTIVES OF THE STUDY

- To study and analyze the Recruitment and Selection process followed in Kinetic Engineering Limited.
- To analyze the satisfactory level of the employees about Recruitment and Selection procedure in Kinetic Engineering Limited.

4. SCOPE OF THE STUDY:

The present research is restricted to study the recruitment and selection process followed in Kinetic Engineering Limited. The study reveals the recruitment and selection process followed in the organization. Whether employees are satisfied with the recruitment process? Is the organization is providing ethical process for recruiting employees? The organizational study of Kinetic Engineering Limited was done with the study of recruitment and selection.

5. RESEARCH DESIGN:

In the process of selection of Kinetic Engineering Limited, only those units having 150 + employees are chosen.

Table 1

Sr.No	Kinetic Engineering Limited.(Dept.)	Number employees	of	Sample size*	Interviewed per dept.@ Kinetic
1	A	236		84	84
2	B	267		95	95
3	C	198		69	69
4	Total	701		248	248

Sample size of 248* is determined by using Morgan table from the total employees of 701. In the process of data collection the sample number of employees were interviewed in proportion to size of employees in Kinetic

Engineering Limited total sample so determined 248. Thus from A dept.84, B dept 95 and C dept69 employees were contacted.

Appendix-1
Morgan Table for Determining Sample Size

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size
"S" is sample size.

Source: Krejcie & Morgan, 1970

Research design is defined as the specification of methods and procedures for accruing the information needed. It is a plan of organization frame for doing the collection of data. Data which is required for the study is collected from both the primary and secondary source (Thornh, 2003). Primary data was of three departments of Kinetic Engineering Limited. in Pune, having total number 701 workers collected through e-mail-survey-questionnaire methods by distributing questionnaires to 248 employees as shown in the table above. Sample size is duly determined by using Morgan table.

Table 1.1

S. No	Designation	No. of Employees	% total no of employees	Questionnaires given	Respondents
1	Senior Mangers	18	07	18	18
2	Junior Managers	42	17	42	42
3	Floor workers	134	54	134	134
4	Production workers	32	13	32	32
5	Others	22	09	22	22
6	Total	248	100	248	248

Analysis of Opinion on Recruitment and Selection Process of the Organization (n=248)

Table 1.1.2

S. No	Particulars	No. of Respondents	Percentage
1	Very good	62	25
2	Good	124	50
3	Average	62	25

4	.Poor	0	0
5	Total	248	100

Analysis of Opinions on Recruitment and Selection Process (RSP) of Kinetic Engineering Limited, under survey reveal that as large as 75% department are having the RSP either “very good” or “good “category while 25% dept. are reported to have “Average” performance in the same .The further enquiries revealed that these departments having comparatively small number of employees and low scale of salary.

Analysis of opinion on modification of Recruitment policy

Table 1.1.3

S.No	Particulars	No .of Respondents	Percentage
1	Yes	50	20
2	No	198	80
3	Total	248	100

Analysis of opinions on favoritism at the time of Selection

Table 1.1.4

S. No	Particulars	No .of Respondents	Percentage
1	Yes	0	0
2	No	248	100
3	Total	248	100

Analysis of satisfaction of Recruitment Procedure in the Organization

Table 1.1.5

S. No	Particulars	No. of Respondents	Percentage
1	Yes	200	90
2	No	48	10
3	Total	248	100

Analysis of satisfaction of Selection Process

Table 1.1.6

S. No	Particulars	No. of Respondents	Percentage
1	Very good	112	45
2	Good	136	55
3	Average	0	0
4	Poor	0	0
5	Total	248	100

Analysis to know about the job vacancies in the organization

Table 1.1.7

S. No	Particulars	No.of Respondents	Percentage
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1	Very good		0
2	Good	148	60
3	Average	37	15
4	Poor	62	25
5	Total	248	100

Analysis of work experience of the employees

Table 1.1.8

S. No	Particulars	No.of Respondents	Percentage
1	Yes	62	25
2	No	186	75
3	Total	248	100

Analysis of Organizational Climate

Table 1.1.9

S. No	Particulars	No.of Respondents	Percentage
1	Very good	86	35
2	Good	124	50
3	Average	37	15
4	Poor	0	0
5	Total	248	100

Analysis of opinion of best source to recruit the employee in your organization

Table 1.1.10

S. No	Particulars	No.of Respondents	Percentage
1	Externalsource	89	37.5
2	Internalsource	159	62.5
.3	Total	248	100

Analysis of recruitment Process in the organization is ethical

Table 1.1.11

S. No	Particulars	No.of Respondents	Percentage
2	Yes		0
3	No	248	100
	Total	248	100

Analysis of referral bonus for the recommending employees

Table 1.1.12

S. No	Particulars	No. of Respondents	Percentage
1	Yes	0	0
2	No	248	100
3	Total	248	100

Analysis of conditions that stimulated to apply for the job

Table 1.1.13

S.No	Particulars	No.ofRespondents	Percentage
2	Working Conditions	82	33
3	Salary and Benefits	32	13
4	Good will of the Company	59	24
5	All of the above	74	30
	Total	248	100

6. CONCLUSION:

The study was conducted among the workers and managers of Kinetic Engineering Ltd. The data was collected by means of questionnaire and the data was classified and analyzed carefully by all means. From the analysis, it has been found that the most of the employees in the company were satisfied but changes are required according to the changing scenario of recruitment process that has a great impact on working of the company as a fresh blood; new idea enters in the company. Selection process is also good and the company's recruitment department is doing well in placing the candidates and filling the job vacancies for all levels of positions. Some of the suggestions were mentioned to enhance the organizational policies, strategies, procedures and process.

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A Study on Factors swaying Consumers Decision towards Selection of Private Hospitals

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Abstract: *With the increase awareness, decline of the government role in the health sector the disenfranchisement from government hospitals the shift of public to private hospitals is a phenomenon witnessed In India for past couple of decades. The government support, market demand and supportive policies have created a demand never than before for private health care industry. The entries of corporate players have added a new dimension that has forced traditional players to introspect their present service models. The choice of a particular hospital by a patient can be a complex phenomenon in case of rural areas where the choices are constrained by various factors. This study is an attempt to identify the crucial factors influencing the decision making process in case of choice of hospitals. The study reveals that amongst the various set of factors word of mouth either from friends, relatives forms an important consideration for aiding decision whereas advertisement and listing by insurance companies seems to irrelevant in regards to choice of hospitals. The onus and trust of patients on word of mouth implies the need by hospital administration to focus on enhancing service quality and closing the service gaps through proper identification and addressing the issues.*

Key Words: *private hospitals, word of mouth, service quality*

1. INTRODUCTION:

The provision of medical care varies across countries and the nature of such provisioning is determined by the socio-economic and political forces in a given society. Although there is great variety in provisioning, broadly there are three major types. First, there are countries where the state plays a central role in the finance, provision and administration of services but at the same time private interests in the form of individual practice, hospitals and other supportive services coexist. Second, there are countries where the state is the sole provider of medical care and no private interests are allowed. Third, there are countries which rely largely on the market for the provisioning of services. The Indian service sector accounts for a large part of the Indian economy in terms of employment potential or its contribution to the national income. Healthcare is one of India's largest service sectors, in terms of revenue and employment, and one can well witness the sector to expand rapidly. With the fast growing purchasing power, Indian patients are willing to pay more to avail health care services of international standard. In the era of globalization and heightened competition, it has been observed that delivery of quality service is imperative for Indian healthcare providers to satisfy their indoor as well as outdoor patients During the last few decades, the number of private centers providing health care services in Ahmednagar district has been growing, and the private sector health care services market has turned out to be a competitive environment. Quality is such an important aspect that it is considered a really major concept in our real life. It is considered as a strategic weapon. And the vital need of increasing service organizations and advancing their services necessitates the measuring of service quality. The peer competitions have made the hospitals to provide superior services in order to retain in the competitive environment.

2. LITERATURE REVIEW:

Service Quality

Traditionally, service quality has been conceptualized as the difference between customer expectations regarding a service to be received and perceptions of the service being received (Gronroos, 2001; Parasuraman, Zeithaml, & Berry, 1988). In some earlier studies, service quality has been referred as the extent to which a service meets customer's needs or expectations (Lewis & Mitchell, 1990; Dotchin & Oakland, 1994).

It is also conceptualized as the consumers overall impression of the relative inferiority or superiority of the services (Zeithaml, Berry, & Parasuraman, 1990).

Service Quality Dimensions

Parasuraman et al. (1988) identified five dimensions of service quality (Viz. reliability, responsiveness, assurance, empathy, and tangibles) that link specific service characteristics to consumer's expectations. (a) Tangibles-physical facilities, equipment and appearance of personnel;

- (a) Tangibles-physical facilities, equipment and appearance of personnel;
- (b) Empathy- caring, individualized attention;
- (c) Assurance- knowledge and courtesy of employees and their ability to convey trust and confidence;
- (d) Reliability- ability to perform the promised service dependably and accurately; and
- (e) Responsiveness- willingness to help customers and provide prompt service.

Gaps in Service Quality

Gap 1: The difference between management perceptions of what customers expect and what customers really do expect

Gap 2: The difference between management perceptions and service quality specifications - the standards gap

Gap 3: The difference between management perceptions of what customers expect and what customers really do expect

Gap 4: The difference between management perceptions and service quality specifications - the standards gap

Gap 5: The difference between what customers expect of a service and what they actually receive expectations are made up of past experience, word-of-mouth and needs/wants of customers measurement is on the basis of two sets of statements in groups according to the five key service dimensions

Patient Satisfaction

Patients, in general, receive various services of medical care and judge the quality of services delivered to them (Choi et al., 2004). The service quality has two dimensions (a) Technical dimension i.e., the core service provided and (b) a process/functional dimension i.e., how the service is provided (Grönroos 2000). Parasuraman, et al (1988) suggested a widely used model known as SERVQUAL for evaluating the superiority of the service quality. In the SERVQUAL model, Parasuraman et al. identified the gap between the perception and expectation of consumers on the basis of five attributes viz. reliability, responsiveness, assurance, empathy and tangibles to measure consumer satisfaction in the light of service quality (Parasuraman A., Berry L, 1988).

In general, patient satisfaction surveys are used to examine the quality of the healthcare service provided (Lin and Kelly 1995). Much evidence has been documented for the service quality to satisfaction link in different consumer satisfaction studies including those in the area of health care marketing (Brady and Robertson 2001; Gotlieb, Grewal, and Brown 1994; Rust and Oliver 1994; Andaleeb 2001).

The Consumer Assessment of Healthcare Providers and Systems (CAHPS) is one of the tools applied for measuring patient satisfaction with quality of care. According to Agency for Healthcare Research and Quality (2009), CAHPS is an internationally validated tool to be anchored on a specific episode of contact between the patient and healthcare professional. CAHPS focuses on assessing the actual experience of patients during care process instead of measuring patients' perception. As per the CAHPS Methodology, patients are asked to indicate if they receive any specific quality of care. Nesreen A. Alaloola (2008) conducted research survey to find Patient satisfaction in a Riyadh Tertiary Care Centre. There was a significant satisfaction with room comfort, room temperature, room call button system, room cleanliness and respectful staff. Patients were significantly dissatisfied with phlebotomists not introducing themselves, not explaining procedures and physicians not introducing themselves.

Dennish J Scotti and Joel Harmon (2009) assessed the importance of customer contact intensity at the service encounter level as a determinant of service quality assessments. It showed that performance-driven human resources practices play an important role as determinants of employee customer orientation and service capability in both high-contact (outpatient healthcare) and low-contact (benefits claim processing) human service contexts. However, there existed significant

differences across service delivery settings in the customer orientation and the similarity between employee and customer perceptions of service quality, depending on the intensity of customer contact. In both contexts, it was found that managerial attention to high performance work systems and customer-orientation has the potential to favorably impact perceptions of service quality, amplify consumer satisfaction, and enhance operational efficiency.

Abdul Majeed Alhashem, Habib Alquraini and Rafiqul I. Chowdhury (2011) measured the quality of health care services and patient satisfaction as one of the most important indicators. The study aimed to identify factors affecting patient's satisfaction at primary health care clinics. The data was collected during January 2007 and May 2007 through a randomly-distributed questionnaire. The questionnaires were distributed in primary healthcare clinics that represent all health care regions in Kuwait. A total of 426 completed questionnaires, out of 500, were returned resulting in a response rate of 85.2 percent. The majority (87 percent) of the patients responded that the time for communication between physician and patient was not enough.

SERVQUAL MODEL

Measuring service quality is difficult due to its unique characteristics: Intangibility, heterogeneity, inseparability and perishability (Bateson, 1995). Service quality is linked to the concepts of perceptions and expectations (Parasuraman et al., 1985, 1988; Lewis and Mitchell, 1990). Customers' perceptions of service quality result from a comparison of their before-service expectations with their actual service experience. The service will be considered excellent, if perceptions exceed expectations; it will be regarded as good or adequate, if it only equals the expectations; the service will be classed as bad, poor or deficient, if it does not meet them (Vázquez et al., 2001). Based on this perspective, Parasuraman et al. developed a scale for measuring service quality, which is mostly popular known as SERVQUAL. This scale operationalizes service quality by calculating the difference between expectations and perceptions, evaluating both in relation to the 22 items that represent five service quality dimensions known as 'tangibles', 'reliability', 'responsiveness', 'assurance' and 'empathy'.

The SERVQUAL scale has been tested and/or adapted in a great number of studies conducted in various service settings, cultural contexts and geographic locations like the quality of service offered by a hospital (Babakus and Mangold, 1989), a CPA firm (Bojanic, 1991), a dental school patient clinic, business school placement center, tire store, and acute care hospital (Carman, 1990), pest control, dry cleaning, and fast food (Cronin and Taylor, 1992), banking (Cronin and Taylor, 1992; Spreng and Singh, 1993; Sharma and Mehta, 2004) and discount and departmental stores (Finn and Lamb, 1991). All these studies do not support the factor structure proposed by Parasuraman et al. (1988). The universality of the scale and its dimensions has also been the subject of criticisms (Lapierre et al., 1996) and it is suggested that they require customization to the specific service sector in which they are applied.

3. METHODOLOGY:

The private hospitals having bed size of more than 100 beds were selected for the present study. The reason for setting the above criteria was that big ticket hospitals would be more allied with patients expectations on various aspects and it was expected that these hospitals would have their service practices in allegiance to the patient expectations as initial investigations suggested that small hospitals faced many difficulties such as untrained manpower, shortage of resources, lack of professional approach to name a few. Further only IPD patients were included as they were admitted and could in way experience the service quality first hand. 10 major hospitals in ahmednagar district were all included in the present study and patients were interviewed on a convenience basis from each of these hospitals in proportion to the available beds in these hospitals. The patients were presented with the structured SERVQUAL instrument with 3 additional statements apart from Parsuraman instrument. The population of patients in the area under study is about 3030. As such the researcher has selected representative samples of 303 patients. The samples cover patients from different departments admitted with different ailments. The method of selection was convenience sampling

The questions included multiple choice questions, dichotomous questions and also questions based on a 7 point Likert scale. The 7 point scale was used in order to lend more granularity to the existing research. The service quality is measured on each dimension of service quality including tangibility, empathy, reliability, responsiveness. Further the hospital attributes include department, type of hospital. The testing had been done as follows

- The score of the patient on the scale 0-7 is multiplied the relative weight assigned by the patient to each dimension. The mean score of each respondent on each dimension is calculated. The mean score is divided further by number of valid responses.

- The mean expectation score and mean perception score are calculated and difference is calculated which is further processed to calculate the mean difference.
- The score obtained are further compared using ANOVA and t test to note the significant differences across various group of sample.

4. FINDINGS:

65% of the respondents from the sample are male whereas the percentage of female respondents is mere 35%. The clear inclination of the sample towards one particular gender also highlights the underlying socio economic status in the society. 25% each of the respondent belongs to the age group 21-30 and 51-60 whereas 33% of the respondents belong to the age group 31-40. The inclusion of more than 50% of the population amongst the age group below 40 is surprising but in allegiance to the observed social trends as more and more young portion of the population has been subjected to hospitalization. There are only 7% of the respondents who are above the age of 60.79% of the sample consists of married respondents whereas the percentage of unmarried respondents probably from the age group 21-30 is 16%. The percentage of widows and divorcee is 2% each while the rest of respondents have not responded to the same.11% of the sample who have claimed themselves to be illiterate which again may be attributed to the fact that the list of hospitals that are included in the given study include charitable hospitals governed by the trust which cater to large section of the society in the vicinity who are mostly farmers. 24% of the sample includes graduates whereas 8% of the sample is post graduates.The remaining respondents have reported various levels of education such as SSC who are 25%, Diploma holders 10% and 21% patients who are educated up to HSC. The awareness of the respondents towards medical insurance may be a critical determinant regarding the decision to avail services of private hospitals in comparison to government hospitals. 37% of the respondents have claimed that they are aware of insurance whereas the majority has indicated that they are not aware that cost of hospitalization can be covered through medical insurance. 12% of the respondents have reported income less than 10 thousand whereas 16% of the respondents have reported monthly household income in the range 40 thousand to 50,000 per month. 85% of the respondents have reported that the patient at discharge was completely cured whereas only 1% each has reported either shift to other hospital or death of patient.

4.1 Factors Influencing Choice of Hospital

- 60% of the respondents have reported that proximity of the hospital is significant factor influencing the choice of hospitals. This again may be corroborated by everyday experience that most of these patients have given proximity due importance to logistic reasons.54% of the respondents have expressed the opinion that name and fame of the hospital is an important factor in choice of hospital.
- 59% of the respondents have reported that prior experience of the hospital is an important determinant of hospital selection. Only 9% of the respondents have reported that they do not consider prior experience of the hospital as an important factor in choice of hospitals. 73% of the respondents have reported that rate of treatment by private hospital is an important factor in choice of hospital.13% of the respondents on other hand have denied the consideration of treatment rates as a factor in choice of hospitals.
- 50% of the respondent shall prefer a particular hospital if their relative is an employee of that particular hospital. On other hand 30% of the respondents have categorically ruled out any such possibility. The choice of a particular hospital due to the association of an expert doctor with that particular hospital is acknowledged by 85% of the respondents whereas only 7% of the respondents have denied the importance of the same in their decision making process.
- 61% of the respondents do not consider the listing of the hospital by insurance company as an important determinant of hospital selection, which again given in the context of study where 60% of respondents have no health cover seems to be in coherence with observed real life situation.
- 34% of the respondents seem to be influenced by hospital advertisements but a substantial percentage of the population seems to be undecided about the impact of advertising in their choice of hospital selection. Again given the fact that most of the hospitals put information for health camps it would be interesting to further inquire the exact form of advertising that the patients seems to be impressed by. It can be inferred that word of mouth or recommendation seems to play a major role in deciding the hospital by patients.
- 78% of the patients have reported that recommendation or word of mouth by their friend or relatives forms an important consideration in choice of hospital.19% of the respondents have reported that they have selected a particular hospital due to the fact that their doctor has recommended the same. But equally important is the fact that 58% of the respondents of total sample have not commented on this particular factor.

4.2 Factor Analysis of Variables Influencing Selection Of Hospital

Factor analysis of variables influencing choice of hospital reveals 3 set of factors according to factor loadings. Direct oblimin method of rotation is used for obtaining factor loadings reveal following 3 construct for selection of hospital

- *Construct I: Advocate factor*

It includes variables such as prior experience, recommendation by relative, friend or family doctor.

- *Construct II: Fame*

It includes two variables such as name and fame of hospital and association of expert doctor who in turn brings name to the hospital

- *Construct III: External factors*

It includes variables such as listing of hospital by insurance companies, hospital rates and advertisement of hospitals.

From the above factor analysis it can be inferred that the introvert factors play a significant role in selection of hospital

5. CONCLUSION:

From the discussion preceding the statistical figures it can be concluded that when choosing a private hospital patients rely on factors that affect the stages of decision making process such as information accumulation, deliberation and comparison of choices and selection of choice thus making a decision. From the study it can be substantiated in the initial stage of information accumulation most of the patients have relayed on friend or relative recommendation word of mouth than advertisement or listing of hospitals by insurance companies. The choice of hospitals in case of emergency becomes an impulse decision where the patients seldom do get a chance of deliberation on selection of hospitals especially in case of emergency. Further the underlying fact that the choice of hospitals is influenced by word of mouth it implies that private hospitals in the narrative of stiff competition shall strive for more satisfied customers rather than spending their resources on advertisements. This in turn calls for careful and craft full attention to attending to patients needs which may require more companionate approach from hospital staff that shall require training of their human resources.

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**‘Sanjyot-2018’ National Seminar on
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Consumer Adoption of Digital Banking Channels: Seedling Transformation towards Cashless India

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***Abstract:** As India marches towards far reaching socio – economic changes, there is a need for our banks to gear up to catch the bus before we miss it. It is here that our disruptive policy initiatives like digital India, demonetization can fuel the digital banking channels to foster consumer adoption of technology and make India a powerful nation as banking is the backbone of a nation. This study is an effort to explore the adoption of internet banking by the common man in a selected geographical area and suggests measures to make Digital India drive an inclusive reality in our country.*

***Key Words:** Digital India, Internet Banking, Cashless India, Online Services, Offline Services*

1. INTRODUCTION:

The digitisation programme - flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy has seeded banking revolution to reach out to the unreached in an effective and efficient manner apart from driving “faceless, paperless and cashless” transactions. The banking system indeed serves as a catalyst in the economic development of our country. It caters to the credit needs of all sections of people in our society and supports nation building in an inclusive manner. Since the days of yore this system has played a significant role in the socio economic progress of our nation as there are references to the money-lenders, in the form of *sahukars* and *zamindars* who lent money by mortgaging the land property of the borrowers in the ancient days to the 20th century banking model which is highly regulated by RBI fostering a safe and secure banking ecosystem across the length and breadth of our country. However India is on the march towards far reaching socio – economic changes and this needs our banks to gear up and catch the bus before we miss it. It is here that our disruptive policy initiatives like digital India, demonetisation can fuel the digital banking channels to foster consumer adoption of technology and make India a powerful nation as banking is the backbone of a nation.

2. REVIEW OF LITERATURE:

Literature highlights that adoption of technology in the banking sector is not a recent phenomenon. Increasing customer expectations and tough competition has indeed made the banking sector to embrace information technology and other technological advancements. This has brought about anywhere, anytime, anyway banking dream of the customers a reality. This is seeing the transformation of the brick and mortar banking system to focus on a more customer friendly and customer centric banking. With the popularity of PCs, easy access to Internet and World Wide Web (WWW), banks increasingly use Internet as a channel for receiving instructions and delivering their products and services to their customers. This form of banking is generally referred to as Internet Banking, although the range of products and services offered by different banks vary widely both in their content and sophistication (RBI, 2001). Initially it was the private sector banks and the foreign banks that adopted internet banking facilities but liberalisation, privatisation and globalisation in the early 90’s has made it a buzzword of the day and banks are trying to reinvent technology to their best

advantage and customer delight. Internet banking – a digital banking channel presently offers its customers a wide range of online and offline banking products and services. The online banking services can be categorised as;

ONLINE SERVICES	OFFLINE SERVICES
<ul style="list-style-type: none">-Account summary-Transaction details-Overdraft details-Online requests-Fund transfer between own accounts-Adding of account in beneficiary list-Viewing of beneficiary-Standing order- E-Payment facilities- Online enquiry for cheque status, cheque book, outward cheques enquiry, TDS details- View contact details-Change login/transaction password- change user preferenceView login history ...	<ul style="list-style-type: none">-Deposit account opening-Deposit amend/renewal-Closure of deposit account-Issuance of demand drafts and delivery options-Account statementCheck book issue-Funds transfer facility-Account transfer-Phone banking-SMS banking-Loan account opening-Request status enquiry-Deposit Modelling ...

Source: https://www.allahabadbank.in/pdf/Product_Services_IB.pdf

In spite of the competitive services being offered by banks to lure customers and policy initiatives of our government like chocking of physical currency supply, our nation has not been able to create any big leap in the digital transactions. The biggest year to year growth in overall retail digital transaction was recorded between 2011-12 to 2012-13 was 53% and between 2012-13 to 2013-14 was 49%, while in the last financial year (2016-17) witnessed only a growth of 46% from the previous financial year despite currency crunch and a digital push. Data on cash withdrawal shows people are merrily back to the use of cash as in the pre-demonetisation era. The cash withdrawals show that numbers rose to Rs.2,262 billion in March 2017 and to Rs.2,171 billion in April 2017. This should be compared with the pre-demonetisation months September 2016 & October 2016 where we witnessed withdrawals of Rs.2,223 billion & Rs.2,551 billion respectively. Looking towards the growth of UPI as well as BHIM (which is of course a subset of UPI) may create an impression that we made a giant leap in terms of digital transactions. But it is important to place this data next to ground realities. The NPCI website claims that as of May 31, 2017 BHIM crossed 14.54 million downloads. We have more than 300 million smart phones in India, which means that BHIM penetration is still below 5% of total smart phone penetration. Studies also highlight that consumer perception of the e banking features and their evaluation of the same is very important for the acceptance of technology. But there is a need of relevant data in this regard (Sathya, 1999). This paper hence tries to study the consumer adoption or non adoption of digital technology in banking in a sample area like Pondicherry post the demonetisation era so as to explore the reasons behind adoption or non adoption.

3. OBJECTIVES OF THE STUDY:

The major objectives of the study are;

- To examine the influence of demography on consumer awareness towards internet banking services provided by their banking channels.
- To understand the variation among gender as to the reason for adoption/non adoption of internet banking services.
- To evaluate the challenges involved in the adoption of internet banking based on consumers opinion rating on the various internet banking services.
- To suggest measures for adoption of internet banking services.

4. RESEARCH METHODOLOGY:

The sample for this study comprised of the common man representing the categories of employees in government/private sector, self employed, students and home makers. The sample size is 100. Convenience sampling method was used. The reasons of using this sampling type are twofold. First, it offers an easy way to obtain the raw data

for the further analysis. Second, it saves times and costs since the respondents can be randomly selected. As the Digital India program aims at inclusion the above sample units identified for the study is very much justified. Although there are limitations of using students as subjects, they are appropriate in this study for several reasons. First they are familiar with internet banking and second, student sample reflects current and future banking customers.

Monthly data post demonetisation period from February 2016 to May 2016 was collected for the study using a structured questionnaire and the responses were categorised on a 5 point Likert scale.

5. DISCUSSION & FINDINGS:

Table 1: Summary table of the demographic characteristics of the sample units

Demographic Variable	Items	No: of Respondents
Gender	Male	63
	Female	37
	Total	100
Age	18-25 years	35
	26-30 years	30
	31-40 years	17
	41-50 years	12
	51-60 years	06
	60+ years	00
	Total	100
Education	Primary	4
	Secondary	8
	Under graduate	82
	Post graduate	06
	Others	00
	Total	100
Occupation	Government employee	17
	Private employee	48
	Student	04
	Self employed	08
	Home maker	03
	Total	100
Account	Savings A/c	92
	Savings & Current A/c	08
	Total	100
Bank Type	Public	85
	Private	15
	Total	100
Length of using internet banking	Less than 1 year	32
	1-2 years	31
	2-3 years	15
	3-4 years	11
	More than 4 years	11
	Total	100

Source: Computed from primary data

Table 2: General opinion on internet banking and its services

Internet banking opinion	No: of Respondents
Important	29
Essential	50
Desirable	15
Cannot say exactly	06
Total	100
Internet banking channel preferred	Mean Score
ATM	3.99
Branch banking	3.00
Mobile banking	2.76
Phone banking	1.86
Office/PC/Home banking	1.59
Adoption of internet banking services	Mean Score
Viewing account balance	3.81
Viewing recent transaction	3.63
Download bank statement	2.99
Order cheque book	2.68
View image of paid cheque	2.76
Fund transfer	3.32
Utility bill payment	3.22
Process pay bill	2.63

Source: computed from primary data

Table 2 shows that 79% of consumers find that internet banking services is important and essential. The frequently used service by them is ATM followed by branch banking and consumers seem to use frequently basic services more than other advanced and virtual banking services.

Table 3: Source of knowledge on internet banking

Sources	No: of Respondents
Bank Officials	34
TV ads	18
Friends	23
Family	01
Print media ads	09
Online	15
Others	00
Total	100

Source: Computed from primary data

Table 3 shows that consumers source of awareness on internet banking is from the bank officials and friends followed by TV advertisements.

Table 4: Reasons for using internet banking services

S.No:	Reasons	Mean score on 5 point scale	Rank
1.	Internet banking services are generally faster than traditional banking services	4.09	1
2.	Internet banking has no time limit	3.85	3
3.	High degree of convenience	3.83	4

4.	Internet banking channels are easy to use	3.90	2
5.	Internet banking services are cheaper	3.64	5
6.	Internet Banking services is a status symbol	3.61	6

Source: Computed from primary data

Table 5 showing comparison of reason for using internet banking services among gender

S.No:	Reason	Rank by Male R_m	Rank by Female R_f	$d = R_m - R_f$ d^2
1.	Internet banking services are generally faster than traditional banking services	1	1	0
2.	Internet banking has no time limit	3	3	0
3.	High degree of convenience	4	4	0
4.	Internet banking channels are easy to use	2	1	1
5.	Internet banking services are cheaper	5	5	0
6.	Internet banking services is a status symbol	6	6	0

Source: Computed from primary data

Spearman's rank correlation test was applied to the above table 6 and the value of $r = 0.972$. This shows that there is a perfect correlation in the opinion of male and female consumers in their opinion in using internet banking services. Also the top 3 reasons for use of internet banking are speed, ease and any time access.

Table 7: Reasons for not using internet banking services

S.No:	Reason	Mean score based on 5 point scale	Rank
1.	Security concerns demotivates from internet banking	3.6	3
2.	Lack of awareness of internet banking services	3.63	2
3.	No privacy of customer information	3.21	6
4.	Customers like using traditional banking	3.45	5
5.	Banks provide only few internet banking services	3.75	1
6.	Banks charge high fees for using internet banking	3.49	4

Source: Computed from primary data

Table 7 shows the reasons for not using internet banking and applying Spearman's rank correlation the value of r was found to be 0.1. This means there is no correlation among gender in their reasons for not using internet banking and we observe that security concerns is the major reason for not using internet banking among female consumers while lack of awareness of internet banking services is the reason among male consumers.

Table 8 showing computer usage

S.No:	Computer usage	Mean Score
1.	Like to use advance technology	4.29
2.	Understand technology without help from others	4.04
3.	I am confident in using internet	4.06
4.	I have easy access to internet	4.11

Source: Computed from primary data

Table 8 shows a good level of usage of computer among the consumers and is influenced by the need to use advance technology.

Table 9 showing overall satisfaction with internet banking

S.No:	Satisfaction	No: of respondents
1.	Very satisfied	25
2.	Satisfied	59
3.	Neutral	13
4.	Unsatisfied	03
	Total	100

Source: Computed from primary data

Table 9 shows that there is an overall satisfaction with internet banking channel. The study thus shows that there is an increasing adoption of internet banking in the last 1 to 2 years (73%). The bank officials or the bank policy has however been the major source of awareness of internet banking features among the consumers. Security concerns and consumer lack of awareness or usage of the internet banking features seems to de motivate the users. There is also more preference of respondents towards ATM and branch banking than mobile and home banking services. Speed, ease of use and any time access facility are the major reasons for adoption of internet banking though branch banking is still the preferred mode of banking channel used by 53%. An overall satisfaction of 59% is observed among consumers for internet banking.

4.1 Business Implications

The following are the suggestions provided to increase consumer adoption of internet banking;

- Banking officials should spend more time to explain the various internet banking facilities to consumers.
- Certain services must be made online and compulsory to encourage better adoption.
- Banks should organize road shows in companies to explain internet banking services.
- Individual bankers should encourage existing users and attract more users to internet banking services by giving them discount in transaction fee, lucky draw, cash back etc..
- The security involved in banking transaction must be clearly explained to all consumers through advertisements in TV and print media.
- Social media can also be used to explain the security of the transactions done online.
- Internet banking facilities must be provided in more regional languages only then it will reach remote locations of our country.
- Reducing the number of clicks and links while using internet banking will facilitate more people to adopt.
- TV advertisements showing the benefits of internet banking facilities should be promoted.
- Following a customer friendly approach in explaining the services is needed.
- Banks should create awareness in using internet banking for payment of utility bills, ordering cash, cheque image retrieval, ordering of cheque books etc.
- Facilities should be developed to report any mistakes through SMS and acknowledgement SMS should be sent immediately on receipt of SMS from the customer.
- Create awareness on usage of e- wallets, easy recharge etc.

5. CONCLUSION:

This study brings forth the view that there has been an increasing adoption of internet banking in the last 2 years since the Digital India drive coupled with demonetisation policy. However customers concern for security and lack of awareness and usage of the various internet banking facilities is the major de motivator in adoption while consumer interest in usage of computers and internet are motivators for their increasing adoption among the common man. It is also seen that there is adoption of basic internet banking services more so than the other advanced and virtual services. However as literature points out the study also shows that post demonetisation initially there was increasing adherence to internet banking and this slowly fell over the months to branch banking facility rather than continuing adoption. This necessitates more promotion drives and policy initiatives that makes usage of internet banking compulsory to move towards faceless, paperless and cashless transactions seedling digital India. Also as this

study deals with a small sample size, it calls for a more longitudinal study among different cross sections for seedling digital India a reality.

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**‘Sanjyot-2018’ National Seminar on
Emerging Innovations and Strategic Business Practices
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Kopargaon, Dist- Ahmednagar, Maharashtra, India,**

A Study on Facets Of Multicultural Communication In Work Place

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Abstract: *In multicultural working environments the cultural displays vary in respect of the different styles of verbal and non verbal communication of people across the world. Multicultural communication has emerged as an indispensable part of global communication not only to enrich world economy but also to meet the crucial challenges of global operations of MNCs beneficially. Culture reflects a set of values, beliefs, norms, customs and codes of behavior to influence employee which impacts the job satisfaction. A team should be able to interact with divergent and crystallize them into profitability. It is significant that people of different nationalities are wrapped in cultural norms that effect human communication in global business environment. An employee have to orient himself to the varied cultural norms of different countries and internalize the team having a positive frame of understanding in order to translate the resourceful projects to gain creditable success in global business. The objective of this paper is to explore the facets of multicultural communications in the work place and approach to employee job satisfaction. The research is carried out on primary data and previous studies, presents the novel viewpoint of the employees in MNCs which leads to further research.*

Key Words: *Multi cultural communication, MNCs , work place.*

1. INTRODUCTION:

Today's world has become more global in its viewpoint and also the market is becoming more and more global in nature with this impact multiculturalism in the offices `will grow. The success of multinational organizations depends on the availability of globally competent workers. Due to extensive globalization, global workers need to embrace cultural intelligence, which is one of the most important factors influencing job satisfaction for workers in multicultural organizations. Global workers face many obstacles to job satisfaction because of cultural diversities and language barriers. Consequently, some expatriates leave the organization or fail to accomplish their overseas assignments.

As people from different cultures work together, their values sometimes conflict with respect to dimensions and communication. When we don't understand each other we at times react in way that create a organization unproductive. Often we are not aware that cultural dissimilarities are the origin of miscommunication. Cultural impact is large on how people perform business. so cultural inferences are serious for succeeding in an international framework. Lack of cultural understanding in business dealings can offend potential clients. Employees who work in other places across the world and have a negative effect on company's bottom line. Precise steps can be taken to improve multicultural communication skills that will enhance personal value. In this regard, the present study examines the issues involved in efforts to develop global workers' cross cultural adaptability through the enhancement of their cultural intelligence and intercultural communication One of the challenges in multi culture communication is that,once a worker has been exposed to viewpoint of someone whose ideas seem new to him, he can initiate to reflect on the thoughts of his world view and it may negatively affect his ability to think and resolve problems. Although the conversion from national culture to a multicultural workplace could result in challenges related adaptations for workers and their employers, multiculturalism at workplace provides many advantages that can help a business prosper. Job satisfactions and organizational obligation are different concepts but several researches have concluded that there is high correlation between these two.earlier researches have shown a causal relationship between these two variables. while some have shown that job satisfaction is a determinant of organizational commitment.In present job satisfaction theory, the feelings and attitudes towards job are highlighted

2. REVIEW OF LITERATURE:

According to Grunig's (1992) study of excellence in organizational communication, the function of employee communication is either directed by public relations officers or human resource managers. Generally big organizations support the public relations approach and the small organizations support the human resources approach. The human resources office is usually responsible for communicating to employees about benefits and company orientation. Communication is necessary to create mutual understandings and to diminish distance between people from different cultures and cut uncertainty during the interaction. The exchange of information is the prerequisite for formal work in the organisations. However, the communication in the workplace is more difficult process than just the information revelation (Bratton, et al. 2007). As A. Hamburg (2012) claims present international business cannot be imagined without intercultural communication. Issues of acceptance and management of cultural diversity play a key role in successful international business relations. Business people who lack intercultural competence and intercultural compassion with no acceptance for and knowledge about cultural differences and their importance cannot expect for great success in maintaining pleasant-sounding relationships in multicultural working environments. more important is, intercultural communication occupy the dimensions of values, attitudes and different expectations of society. An important individual behavior is needed for intercultural resourceful association. cultural intelligence can assist employee in a multicultural environments to become more efficient in decision making, communication, and negotiation across cultures (Liu et al., 2010) by enabling them to lead and motivate others who are culturally diverse and to better manage their international careers(Thomas and Inkson, 2007, 2009; Thomas, 2010).

Sophia Kerby and Crosby Burns' article on multiplicity in the workplace of the American Progress presents the relationship between multiplicity and the economy. This concludes that a diverse workforce of cultures is integral part to a strong economy. The article also explains that diversity plays a great role in strengthening economy. In an article posted on The Multicultural Advantage website, Josh Greenberg, president of AlphaMeasure Inc. in Boulder, Colorado, specifies that multiculturalism allows employees to all contribute based on their own cultural background, practice and other credentials. When a variety of perspectives are thrown into the problem-solving mix, new and innovative solutions can be reached. By offering a platform for sharing of different ideas, businesses can obtain the biggest benefits of diversity in the workplace. According to recent study from Forbes , *"the best way to ensure the development of new ideas is through a diverse and inclusive workforce."* Diversity can raise healthy competition, strengthen the team in a positive way to achieve their best. This atmosphere of healthy competition can lead to the optimization of organisation's processes for greater efficiency. In an article the *Harvard Business Review* states that the challenges of working in a heterogeneous team are one of the reasons why diverse teams perform better: "working on diverse teams produces better outcomes correctly because it's harder." Embracing cultural diversity in the workplace is an essential first step for businesses that want to be competitive on an international level. Diversity and global mindedness are integral to our DNA. Our mission is to prepare our people to succeed in a fast-paced, unpredictable, and international business environment. As we are developing into the global business leaders, can certainly expect to encounter these key

3. OBJECTIVE OF THE STUDY:

- To examine impact of Dimensions of national cultures on multi cultural communication.
- To examine Multinational firm communication impact on job satisfaction.
- To study Language differences effect on employees.
- To study about Communication system in multi cultural firms.

4. RESEARCH METHODOLOGY:

This study is to verify the demographic profile of the employees who are working in multinational companies in Hyderabad area. And the important factors of multi cultural communication which are affecting their satisfaction. A descriptive research design has been used.

4.1 Sampling techniques:

Purposive quota sampling has been used from non- probability sampling method to select people who are working in MNCs in Hyderabad. Collection of primary data: Structured questionnaire for customers are prepared. Questionnaire has close ended and open ended questions. It is divided into 2 divisions. First part entails the personal profile of respondents where questions are related to sex, education, salary, marital status were asked. In second part of the questionnaire the respondents were given with a list of factors and were required to assign a weight to each one, using a 5 point Likert scale. From the total population of Hyderabad corporate employees, 120 people are chosen as sample size for the study and the data is collected through a Structured Questionnaire.

Taking the advantage of technology Questionnaires are posted through various Apps of the smart phone and the response is gathered and structured.

Collection of secondary data: Secondary data was the source of information for conceptual framework of the subject, history background of the study concerned and review of literature.

Secondary data was collected from various data sources are as follows:

- websites
- Various books, journal, magazines, newspaper, Annual reports, Information bulletins
- Reports prepared by research scholars

4.2. Tools and Techniques:

- Percentage Analysis

5. DATA ANALYSIS AND INTERPRETATION:

Table:1 Gender wise distribution.

Gender	Number	Percentage
Male	78	65
Female	42	35
Total	120	100

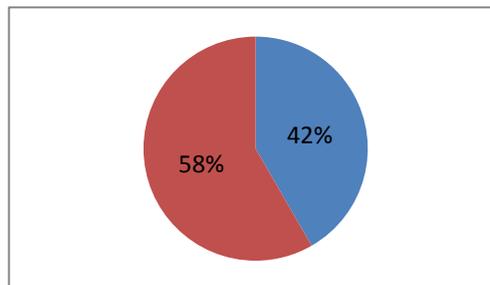


Figure 1 shows that the distribution of respondents who are the employees of MNCs with the basis of gender. It shows that maximum respondents belong to male category .

Table:2 Distribution of respondents according to age.

Age	Number	Percentage (%)
< 30	30	25
30-40	42	35
41-50	36	30
50 >	12	10
Total	125	100

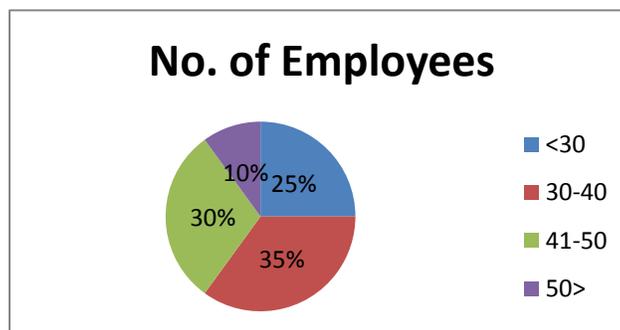


Figure 2 from figure it is inferred that the distribution of respondents is good as we have received responses from each age group ranging from 20 year to more than 60 years age. Among age groups maximum response is from the age group

30 to 40 year which is 35 % whereas minimum response 10 % is received from the customer of age group of above 50 years.

Table 4: Distribution of respondents according to job position

Job position	No. of Respondents	Percentage
Top management	24	20
Middle management	42	35
Operational Management	54	45
Total	120	100

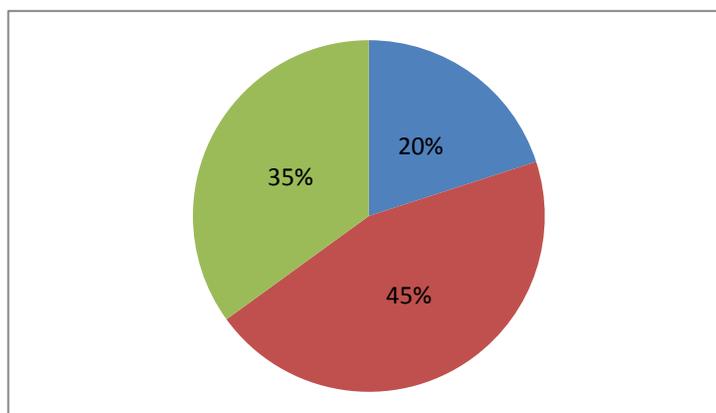


Figure 4 shows the distribution of respondents on the basis of jobposition. And it shows that maximum 45% respondents belong to operational management and minimum of 20% belong to top management.

Table 5: Distribution of respondents according to nationality.

Nationality	Number	Percentage
Indian	90	75
Other	30	25
Total	120	100

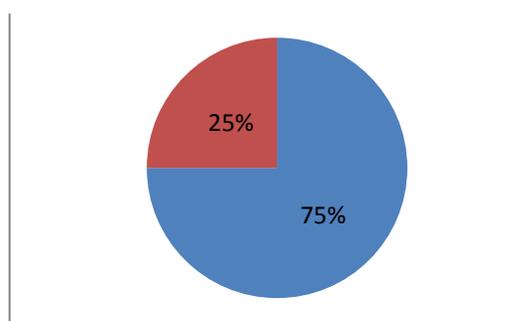


Figure 5 shows the distribution of respondents according to nationality. The respondents from numerous countries with fewer frequencies. With this impact respondents are considered are two categories. Indian employees are 75% and other nationalities are 25%

4.2. Test Hypothesis:

H1: Dimension of national cultures will lead to conflict in multi cultural communication. There are four (4) factors of dimensions of national cultures; these are power distance, masculinity & femininity, individual & group direction and uncertainty prevention were explained to respondents. The following table gives the response of employees who expressed dimension of national cultures impact on multi cultural communication.

Table 6:

Dimensions	No. of Employees	Percentage
Strongly Agree	12	10
Disagree	45	37.5
Uncertain	21	17.5
Agree	33	27.5
Strongly Agree	9	7.5
Total	120	100

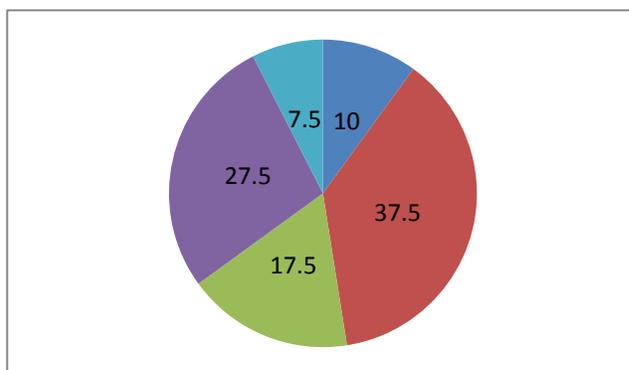


Figure 6 shows the percentage of respondents who expressed their view point on the impact of dimension on multicultural communication. It reveals that maximum 37.5% are disagree the hyposthesis that there is conflict due to dimension of national cultures

H2: Multinational firm communication will lead to conflict in multi-cultural communication. In multinational firms, there are varied allocations of workforce, thus exhibiting varied differences in the culture and social background, which can influence communication between the workforce. The factors of multinational firm communication was explained to employees and their response was recorded

Table 7:

Opinion	Number	Percentage
Yes	45	37.5
No	75	62.5
Total	120	100

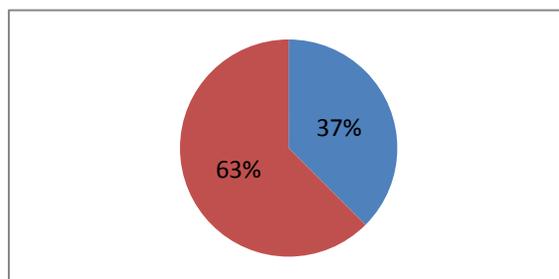


Figure 7 shows that maximum 63% of respondents conclude that there is no conflict in multi cultural communication with respect to culture and social background.

H3: Language will lead to conflict in Multi-cultural communication. Language can be a mediator in any communication with another person when the transfer of the message takes place. This communication can be verbal or non verbal. Based on this the employees expressed their perceptions of language impact on multi cultural communication.

Effect of communication	No of Respondents	Percentage
Agree	33	32.5
Disagree	48	40
No comments	39	27.5
Total	120	100

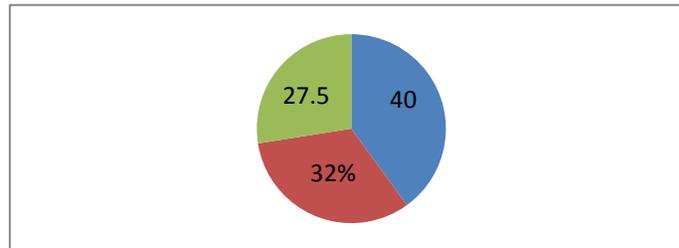


Figure 8: The figure shows that the maximum percentage of respondents expressed that the language cannot create conflicts in multicultural communication.

4.3. Limitations of the study:

- The research was based on primary and secondary data. The primary data required for research objectives was collected from the samples based in Hyderabad city. Although Hyderabad is one of the most important cities of the country and a commercial hub of south India, with only 120 samples selected from the city cannot be considered as a proper representation of the population of the country. However, the objective of the survey was to check the perception of the employees of MNCs with regard to the concept multicultural communication. Thus, this may not create barrier in achieving the desired objective even if Hyderabad city cannot replicate other major banking hubs of the country.
- More analysis is needed to be done using more statistical tools.
- For primary data, non response error cannot be ruled out.

5. CONCLUSION:

Hypothesis H1 examined whether the dimensions of national cultures will lead to conflict in multicultural communication or not. The result showed that the hypothesis was rejected with respect to employee perceptions. Hypotheses H2 examined whether language will lead to conflict in Multi cultural communication. Language is the mediator which connects two persons. The results showed that the hypothesis was rejected. The language creates conflicts in multi cultural communications. Hypothesis H3 examined whether multinational firm communication will lead to conflict in multi-cultural communication. The analysis shows that the hypothesis was rejected. So there is no conflict in multi cultural communication with respect to culture and social background. The factors related to the dimensions of national cultures, language, and communication system did not affect the Multi cultural communication was may be due to the demographic factors. As per the data collected, the highest category of respondents was from the operational management, who are less involved in decision making with management. Generally this level of employees will accept all the orders given by the top management.

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**‘Sanjyot-2018’ National Seminar on
Emerging Innovations and Strategic Business Practices
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Kopergaon, Dist- Ahmednagar, Maharashtra, India,**

Improving Performance Management in Health Care Sector—using Balance Scorecard Framework-A study on Select Hospitals in Bengaluru- India

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Abstract: *The primary responsibility of a hospital is to ensure that patients are provided with best quality health care. The changing nature of today’s health care operations includes pressure to reduce costs, improve quality of care and to meet stringent guidelines. Despite impressive economic growth of nearly 8% in the recent past, India has not made any significant achievement in the healthcare sector. Performance of health care sector has placed India in 112th position in the list of 190 member countries based on the achievement in key functions and objectives of health system (World Health Report 2015) Literature review and research papers have claimed that Balance Scorecard is a management tool that can help organizations to improve performance. Application of Balance scorecard in healthcare is at a very nascent stage in India. This article attempts to examine some contributions, limitations of Balance Scorecard in Health care organizations. There are 3 sections to this article- the first part describes Balance Scorecard as planning tool and analyses the applicability of Balance scorecard in Health care sector, the second part discusses the issues like designing the parameters, use of tools, involvement of all employees regarding the implementation of Balance Scorecard, the third section discusses the perception of cross section of employees in a hospital regarding their awareness/readiness of using Balance Scorecard to improve performance. Methodology used- Three multi-specialty hospitals in Bengaluru were selected for the study. A semi-structured interview was held with departmental heads of these hospitals, relatives who accompanied patients were questioned related to satisfactory level of services at the hospitals. Archival data and non-participant observer also played an important role in collecting information. The paper concludes that Balance Scorecard has the potential to contribute to the implementation of strategies and improve performance, however acceptance and effective adoption requires an appropriate parameters of the Balance Scorecard instrument to the realities of healthcare sector in India.*

Key Words: *Healthcare management, Performance Improvement, Balance Scorecard, Adaption*

1. INTRODUCTION:

1.1. Health care in India:

Health of people is accepted as a universal objective of every nation. It is in fact, the indicator of development of the country. Indian healthcare sector, one of the fastest growing industries, is expected to grow at a CAGR of 22.87 percent during 2015-20 to reach USD 280 billion. There is immense scope for enhancing healthcare services penetration in India. The health care industry in India operates through five segments namely, hospitals, pharmaceuticals, Diagnostics, Medical equipment and supplies, Medical Insurance, and Telemedicine. There are strong growth prospects in this sector in India with strengths like entry of deep-pocketed private sector investments, favorable Government policy, available excellent skilled and talented Human resources, access to insurance and rising incomes, availability of low cost and high quality medical services, imbibing corporate culture and hospital management knowledge.

1.2. Performance Management in Health Care:

In the past century, health care delivery model focused on 'Doctor's performance' as a center of the hospital system. But in due course of time, focus changed. Accountability is a key in transforming modern healthcare practices. Hospitals must be accountable to patients and staff, government health agencies, to their boards of directors, to taxpayers, and general public. Patient-centered care encompasses awareness and communication of all stakeholders of the sector. New modes of delivery has made in roads, aided with information tools responding to the challenges faced by the health care sector. The demand for better performance and delivery is consistent which makes monitoring and feedback imperative. With a growing emphasis on monitoring the quality and consistency of care, the hospitals should introduce a sophisticated operational performance measurement and management which necessitates integration, vision, information flow from different segments of healthcare sector. One such tool is Balance Scorecard which enables the organization to see in the mirror of performance and make corrective actions whenever and wherever required making holistic assessment of the organization in achieving its vision and objectives.

1.3 Concept of Balanced Scorecard:

Kaplan and Norton (1992c) described Balanced Scorecard as a framework that helps organizations translates strategy into operational objectives that drive both behavior and performance. The word balance in the term 'Balanced Scorecard' is inductive of the balanced consideration given to long and short- term objectives, financial and non – financial measures, leading and lagging indicators of external and internal performance perspectives(Kaplan & Norton, 1996b, 1996c; Hendricks *et al.*,2004). The concept of the Balanced Scorecard was first presented in the early 1990s. Robert Kaplan and David Norton from Harvard Business School first presented the "Balanced Scorecard- Measures that Drive Performance", *Harvard Business Review*, January/February 1992.

The Balanced Scorecard strategic management system is comprised of "a construction, core principles and processes that interpret an organization's mission and strategy into a comprehensive set of performance measures strategically aligned with initiatives" (Inamdar *et al.* 2002, p.21). There are 4 perspectives of the model, Financial, Customer, internal process, learning and growth perspective. BSC is a very popular method in many business companies, Currently, this method is being applied in less commercial establishments such as health, social and spa services, it establishes a comprehensive system of financial and non-financial indicators to understand the complex factors dependent on business success. BSC in health care sector is at a nascent stage in India, Many corporate hospitals have indigenously evolved a system of Balance scorecard to integrate and initiate more market focused and customer focused strategy with organizational objectives.

2.REVIEW OF LITERATURE:

During early 1980s, it was realized that traditional measures of financial performance alone did not assist in effective planning & management. Arguing that managers should track financial and non-financial metrics, Robert Kaplan and David Norton (1992) in their first article "The Balance Score Card- Measures that Drive Performance' devised a tool that would measures and improve multi-dimensional areas of organizational effectiveness. They realized that financial performance measures worked well in Industrial era, they were insufficient to measure, non-financial parameters like abilities, skill, competencies, essential for survival in changing business environment. The Balance Score card (1992a, 1993, 1996a, 1996b, 1996c, 2000, 2001a) identifies the importance of non-financial variables upon strategic success. It is a set of measures that offers top managers, a fast and comprehensive mirror of the organization.

- **Need for the study:**

The health system is immense and complex.....change in the health system is subject to a linked chain of effect that connects individual patients, communities and clinicians with small, naturally occurring front line units, with countless large and small host organizations all of which exists in a modulating policy, legal, social, financial and regulatory environment. Oversimplification of the health system is as common as it is foolhardy. (Nelson et al, 2001,). Health care organizations have to manage the costs, but it is even more relevant to understand the relationship between quality and cost. To monitor these variables, the health care system needs an advanced tool like the balanced scorecard (BSC) that is particularly appropriate for organizations in turbulent industries such as health care.(Laura Broccardo-2015)

- An diverse range of key stakeholders including patients and their families, communities, visiting medical officers, staff, regulatory bodies, state and national health departments as well as a range of other government

departments (for example, education and community services), boards. Makes it complicated for health care sectors to focus on building strategies.

- Many health care measurement systems have focus on financial & functionality, and do not focus on organizational strategy or objectives. They are often disconnected and fail to align to organizational goals
- Increasing demands from knowledgeable customers, public and the government has pushed the health care sector to adhere to quality and patient-centric care which necessitates to access the performance from various angles both financial and non-financial perspectives.
- The journey of the main customer, the 'patient', through the health system can be convoluted and unclear with sometimes poor interfaces between the different phases of care including gaps in communication of critical information. This can occur within one hospital or between one hospital and another; the need for right information will help in improving the methodology of giving superior patient care.
- Developing and maintaining strong working relationships between medical staff, especially Visiting Medical Officers, and health service management.

The above mentioned complexities make it important to study how hospitals should improve their performance using modern tools to stay ahead of competition and deliver superior healthcare services.

3. OBJECTIVES OF THE STUDY:

- To study the concept of Balanced Scorecard application in global hospitals.
- To understand its role in organizational performance.
- To understand the perception and readiness of hospital employees in adopting to BSC model

4. RESEARCH DESIGN:

This study is predominantly conceptual by nature; it is an exploratory study to understand the impact and applicability of new tool in assessment and management of Hospital performance.

4.1 Data Collection:

Three Multi-specialties Hospital In Bengaluru, were selected for the study, the criteria of selection of these hospitals were they had a corporate structure in place, though not typical BSC, they had implemented a suitable version of Balance Scorecard to implement and achieve operational efficiencies.

4.2 Tools of data collection:

Semi-structure interviews, Non-participant Observation, Archival data from the hospitals were collected to arrive at the findings and conclusions. Head of departments, HR managers of the hospitals, relatives who accompanied patients in all the three hospitals were respondents of this study.

- **Objective 1: To study the concept of Balanced Scorecard application in global hospitals.**

The Northumbria Healthcare NHS Foundation Trust in England had been recognized as one of the most successful Trusts prior to the introduction of the Balanced Scorecard in 2009 (Marr and Creelman 2010). To ensure they continued to be a high performing healthcare provider, the CEO wrote, "However excellent, past performance is no guarantee of future success. High performing organizations remain so by looking ahead, understanding the challenges and determining the right strategy to maximize unique business opportunities and best manage risks"(Marr and Creelman 2010, p4). A component of this was the introduction of the Balanced Scorecard as their strategic management framework (Marr and Creelman 2010, p11. Emory Healthcare in Atlanta (USA) underwent a major structural change from independent operating units (three hospitals and two faculty practices) to an integrated healthcare system. They found that using the Balanced Scorecard To assist in building a unified system was one of the keys for success in the transition (Bloomquist and Yeager ,2008). In Taiwan, the Mackay Memorial Hospital an accredited medical centre and teaching hospital with 2,149 beds implemented the Balanced Scorecard in 2001 in order to sharpen its competitive advantage (Chang et al 2008).They saw the need to use best practice business tools to help them take a more strategic approach that would differentiate their services and attract more business and that would also improve communication and collaboration between all levels of staff and key stakeholders. In addition, their board requested an annual performance report that would provide a more comprehensive view of the organization's performance in fulfilling its mission.

The Balanced Scorecard was initially introduced at St Vincent’s Private Hospital (Sydney, Australia) in the nursing directorate as a framework for improving clinical governance in order to achieve better outcomes for patients and staff (Aguilera and Walker, 2008). Again, due to the success of this trial, it was later expanded across the whole hospital. From a survey of nine healthcare organizations that were in the early stages of Balanced Scorecard implementation, Inamdar et al (2002) found that the main reason for implementation was a planned response to external forces (for example, increasing financial pressures) that motivated them to search for more effective and relevant strategic management tools than what they were currently using. Kollberg and Elg(2011) healthcare organizations have introduced the Balanced Scorecard primarily as a system to improve health care quality. However, they explain BSC will help in enhancing customer focus, bring about the common value to improve health care and help in strategy implementation. The former aims to monitor outcomes and improve performance and thereby ensure the achievement of organizational strategies and goals, while the latter aims to define, communicate, and reinforce basic values, purpose and direction for the organization in order to encourage growth of business (Kollberg and Elg 2011). Yee Ching Lilian Chan, CMA, FCMA the author has discussed the major changes in Ontario Health System over the last three years. The Ministry of Health and Long-Term Care (the Ministrj’, MOHLTC) has been working on establishing "a patient-focused, result driven, integrated and sustainable health system." Since it's impossible to manage what can't be measured, a critical factor to integrating the financial, clinical, and statistical informant systems of Ontario's health system effectively is to strengthen Ontario's health informant capacity

Some examples of documented reasons for implementation of the balanced scorecard (BSC) in the health sector

Authors	Organizations	Benefits
Aguilera and Walker	St Vincent’s Private Hospital, Australia	2005-2007 Increase in patient satisfaction (from 88% to 96%) •Increase in percentage of patients risk assessed (40% to 90%)
Garling	Children’s Health Systems, USA	Increased customer satisfaction rate Reduced medical staff turnover
Kocakulâh and Austill (2007)	‘Crandon Health System’	Enhanced focus on customer service Improved outcomes with quality improvement programs
Meliones (2001)	Duke Children’s Hospital	18% increase in patient satisfaction 23% reduction in average length of stay Readmission rate drop from 7% to 3% Fulfillment of hospital’s mission
Aidemark and Funck 2008	Medical Clinic at Högland Hospital, Sweden	Significant improvements in clinical outcomes as a result of process and behavior changes Culture transformation
Aidemark and Funck 2009	Medical Clinic at Högland Hospital, Sweden	Quality improvements in patient care and outcomes •Stimulated a new dialogue between clinicians and management about vision and strategy

From the above review, we can conclude that Balance Scorecard in the health sector, can benefits in many ways:

- Operational efficiency and customer satisfaction has increased
- Increases the stakeholders involvement in strategy formulation and implementation
- Since customer focus operations are designed, Customer relationship is strengthened.
- The four perspectives gives the managers effective decisions making capabilities
- Provides a snapshot of the organization which is easy to understand and work on deficiencies

- The process energies the internal stakeholders.
- Focus strategies to achieve vision and mission
- Translates company's vision and strategies and link it to individual objective.

Objective 2: To understand the role of Balance Scorecard in organizational performance

This data is collected from the executives and medical practitioners in the hospitals selected for the study. The results are the perception of the respondents and not the researched factors. Due to promise of confidentiality to be maintained, hospitals names are not disclosed.

Hospital 1:

Hospital 1 is a leading world class health care provider, with cutting edge technology and excellent patient care. They have a strong vision and mission policy towards which every employee is committed. According to Dr. Pratap Rao, ‘It is consequently vital that a holistic approach towards implementing strategy should be adopted since in a health care sector every function is important and no role is less significant than the other’

Requirement for balance Score card:

Hospital 1 has implemented Balanced Scorecard in order to track the progress of its various operations and to measure the impact on the hospital’s growth and profitability. The underlying philosophy behind using BSC in measuring performance was to follow a holistic approach towards implementing strategy since every function is important and no one role is less significant than the other. The Balanced Scorecard is a concept which helps in establishment of the strategic objectives and designs a measurement system which focuses on financial measures and non- financial measures. Following are Hospital 1 balanced scorecard perspectives.

Financial perspective	Customer perspective	internal process perspectives	Learning and growth perspective
Achieve Profitable Growth	Improve patient’s and care taker’s Satisfaction	synchronization of various operations leading to quick service time to customers	Create a Culture of High Performance and Team Based Working among all employees

Main factors associated for successful implementation:

- Maintain focus on patients well -being and care
- SMART (specify, measurable, achievable, reliable and timely) target setting initially
- Constant communication and feedback –‘talk the Balanced Scorecard’ language from top down lines
- Perseverance in implementation
- Clinicians and administrators working together as a team
- Mechanism to turn data into information

Hospital-2

Hospital 2 is one of the most preferred and recognized healthcare flagship hospitals in Bangalore, It is NABH accredited and ranked amongst the Top 10 multispecialty hospitals in India. The BSC in this hospital is built to achieve three dimensional results. One- to develop a strategic report card, two design operational report card and three individual report card in line with strategic review. They were of the opinion that a fourth dimension of ‘Clinical outcome’ should be added to the BSC.

Requirement for balance Score card:

Balanced scorecard is required in a company to align vision at all levels, making employees aware of its strategy and vision and educating them about the operational drivers of the business success. It communicates the role and relationship of each employee with achievement of objective and strategy. Following are Hospital 2 balanced scorecard perspectives

Financial perspective	Customer perspective	Internal process perspectives	Learning and growth perspective
Value, growth, and productivity	Clinical outcomes	Drivers for performance aligned to corporate strategy	understanding, expertise, and management

Main factors associated for successful implementation:

- Participation of board members and senior managers
- Supporting information and timely data in correct format
- New learning and feedback
- Regular monthly/weekly meetings

Hospital 3:

Nethradhama Super Speciality Eye Hospital is a world-class facility focused primarily on quality eye care with cutting edge technology and highly skilled doctors.

Mission – “Vision care par excellence”

Vision – “Leadership in the eye care domain”, Nethradhama strives to live up to the expectations of its patients.

Requirement of Balance Scorecard:

BSC is implemented to achieve the objective of synchronization of various activities in the hospitals, and to commit end-to-end solution to eye care to patients. Seamless transfer of information, **Quality**, patient **satisfaction** and staff **retention** were key areas that the hospital wanted to improve, and they needed to find a way to connect those pursuits to financial outcomes.

Following are Hospital 3 balanced scorecard perspectives

Financial perspective	Customer perspective	internal process perspectives	Learning and growth perspective
<input type="checkbox"/> volume and growth to financial measures. <input type="checkbox"/> Market share	satisfied patients,	<input type="checkbox"/> quality clinical process <input type="checkbox"/> expert clinical care providers	Synchronization and team based delivery of patient care

Main factors associated for successful implementation:

- Clinicians and administrators working closely together in teams for implementation and decision making
- Involvement of employees from top level to lower level employees
- Perceived ease of use
- Timely information for implementation and decision making
- Feedback and training for improvement, supportive culture

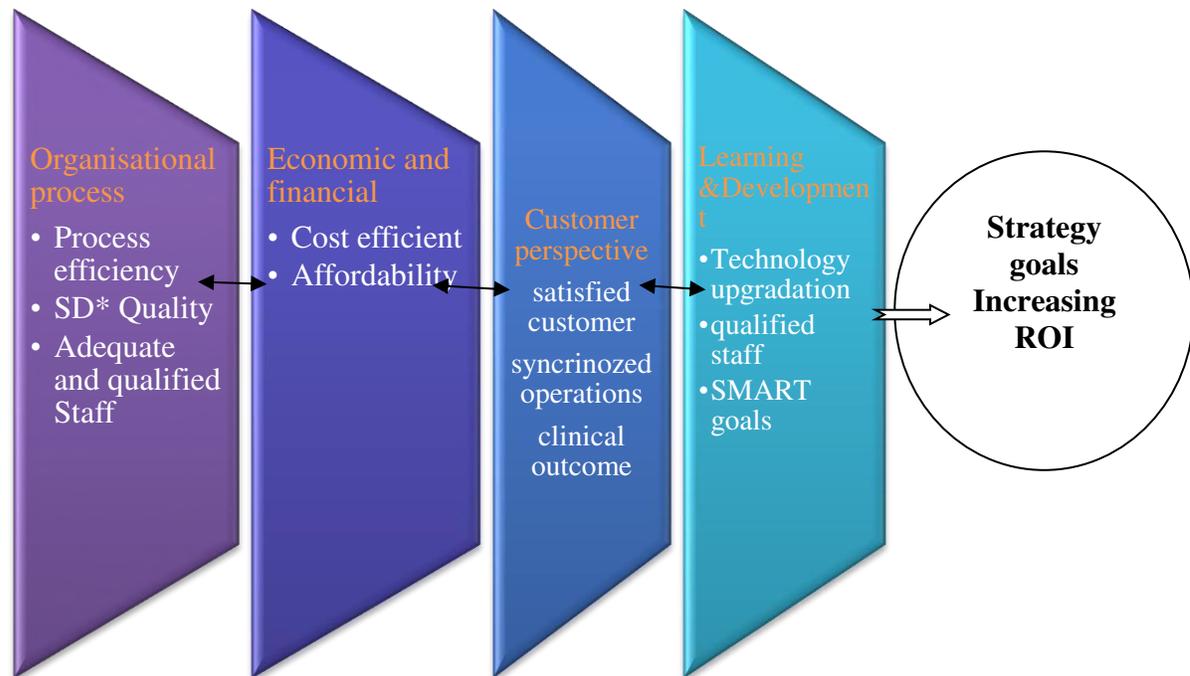
Objective 3: Awareness and perception of implementing BSC among Hospital Employees

	Hospital 1	Hospital 2	Hospital 3
Awareness of BSC	78%	62%	82%
Support towards BSC	52%	83%	93%
Perceived positive benefits of BSC	62%	58%	71%
Perceived negative burden of BSC	38%	42%	29%

FINDINGS:

- Awareness of BSC concept is high in all the hospitals, but there is issues related to its implementation strategy and information control.
- Majority of respondents perceive positive benefits of implementing BSC in achieving goals of the hospital
- Though very popular abroad, Implementing BSC is a very new concept in Indian Hospitals, 25% of the Hospital management executives who were met were not aware of the concept
- The relatives of the patients were not aware of the concept of BSC and there was 80% satisfaction level towards hospital services be the respondents.
- Some of common reasons for implementing BSC is to
 - improve patient care
 - Financial accountability

- synchronize the operations within
- have a radar to gauge the market changes
- The success of implementing BSC is conditional to various factors. Some of the important ones are existing of conducive culture and Team work, Accurate information in right format, regular meetings with cross functional departments.
- Though at the nascent stage, BSC is accepted and appreciated by many employees as a tool to measure and improve organizational performance.
- In the analyzed hospital, the BSC is used as a tool of control and feedback not like a management tool to implement the strategy; consequently, first-generation BSC is used.



Strategy map as analyzed on the data collected by researcher in the

*SD: Service Delivery

5. CONCLUSION:

Indeed, the purpose of BSC, was to implement a turnaround strategy in the health care organizations, As pointed by Kaplan and Norton, systems used to measure results in many organizations were financial indicators, in some sectors like health, education, entertainment, basically service sector non-financial indicators were used for operational management. The dual view of economic vision of management team and clinical view of health care professional did not sync and integrate effectively. There was a requirement of a tool which would help in bridging the two visions. Balance Scorecard is used widely in health care system in the west, but in India is not very popular in the same terminology, there is room for improvement in adapting the tool to the specific requirement of the hospital. In Hospital 2, a fifth dimension was added, 'clinical outcomes' which measures the impact of the clinical process. Yet another importance of BSC is the development of 'Strategic Planning' employees associates themselves to the growth map of the organization through BSC can be harnessed by identifying and building KPIs (key Performance Indicators) Further research:

- The study can be conducted on a larger scale (pan India)to understand the impact of BSC
- BSC model can be development which aims to ease the process of implementation
- Workshops and seminars can be conducted to train and create a awareness of BSC in hospitals in rural sector
- Other participants of health care sector like pharmacy, telemedicine, etc can be a part of larger research process.

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INDIAN ECONOMY: A JOURNEY TOWARDS VISION 2020

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Abstract: India is turning out to be the 4th largest prospering market for World Giants and a double digit appreciation in world rating in the context of ease of doing business are proving out to be the Buzz words in the past consecutive financial years. A retarded economy slowly changed its creeping from depreciation to appreciation and never seen movements like demonetization, Tax Uniformity have rally changed the opinion of entire world about India. This paper is mainly capturing the Surgical Strikes and its Outcomes in terms of financial aspects for the period of past five years. The majority considerations are CAD, FER, FD, IR, Growth Rate, Inflation etc.

Key Words: Surgical Strike, GDP, CAD, FER etc.

1. INTRODUCTION:

Indian Economy has witnessed a paradigm shift in its level of Transparency and Control of Black Money via the historical banning of old Rs. 500 and Rs. 1000 currency notes for general circulation. How currency banning will lead to Terrorism Control, Black Money Control, Balanced Growth Perspective, Inflation Management was a matter of curiosity for everyone in the world, however it started giving it's positive benefits in terms of various Indicators like GDP Rate, Export Revenue, Foreign Reserves, Job Creation, Minimization in Terrorist Attacks etc. The Demonetization alone brought almost Rs1.25Billion (i.e. 1.25 Lakh Crores) under the purview of Indian Banking. In the first week of its Demonetization Indian Banks received almost Rs. 35,000 Crores under its belt. According to the RBI's (Reserve Bank of India) Annual Report for April 2015 to March 2016, the value of the currency notes at the end of March 2016 was INR16.42 trillion. The share of old 500 rupee and 1000 rupee was almost 86.4%.in terms of value.

2. RESEARCH OBJECTIVES:

- To analyze the impact of Demonetization on to Indian Economy.
- To analyze various pre and post changes in consideration to Demonetization.3.

3. CONCEPTUAL FRAMEWORK:

3.1. Black Money:-

According to recent studies on to Indian Economy, it seems that India's black market economy is close to Rs 30 lakh crores accounting almost 20 % of Indian GDP. This number is much larger than the entire economies of countries like Thailand and Argentina.

3.2. Terrorism: -

Cross border terrorism and In house Terrorism are been jointly funded with the Fake Currency market and Black Money Market.

3.3. Economy:-

The Major Economic drivers like Real Estate, Building Material, Gold, Unorganized Trade, and Private Chit Fund etc. have continuously resulted in Inflationary pricing. The major reasons for economy to have accelerated growth rate were lying into these sectors only.

3.4. Election: -

How money was getting used in the domestic as well as State or Nation election. Black Economy was the only source for such a bad practice in the Indian Democracy. Corruption, Violence, Improper Government are all its ill effects causing Nation to remain Developing since past 50 plus years.

3.5. Unorganized Trading:-

- Prices hike in Real estate sectors is mainly because of the involvement of black money, but after taking this decision the prices of property will surely come down to their real value.
- Unorganized dealing in share market will also be eliminated after this decision and this will gain positive result in the economic condition of the country.
- The problem of inflation will get solved with this step as the government will get more money in its pocket in form of taxes and undisclosed income.
- Banking system will also get strengthened as banks will be flooded with huge amount of money. This will also result in more economic development in the nation as the money will be channelized properly through banks.

3.6. Less Cash Economy: -

It is not possible to make India Cash-Less economy, but for the development and making transparency in the economy we can say use of less Cash is possible.

4. IMPACT ANALYSIS:

There is short-term and long-term impact of Demonetization on different sectors of economy.

4.1. Agriculture:

The sector typically sees high cash transactions and therefore near-term impact could be seen till liquidity is infused in the rural areas. As farmers face a temporary shortage of cash in hand, it could lead to a delay in payment which in turn would hurt the related companies in the short term. As liquidity eases and cashless transactions gain acceptance, the fundamentals would be driven by the longer term drivers of normal monsoons and positive traction in acreage.

- **Manufacture:**

Automobile- Two Wheelers: Clampdown on cash transactions and temporary cash crunch could hurt purchases particularly in the economy segment of the two wheeler space where the percentage of cash transactions have been high. However, as companies learn to work around it, demand may pick up by overall growth in consumption on the rural as well as the urban side. Passenger Vehicles: The seasonal slowdown seen during November and December months could get more pronounced as consumers delay purchases due to temporary liquidity crunch and expectations of rate cuts. However, as most passenger vehicles are financed through loans, the blip would be temporary and demand may recover on the back of growth in demand in rural and urban areas as well as trickle down benefit of the 7th Pay Commission Payouts. Commercial Vehicles: Slackness in the economy on account of demonetization could have a negative impact on the commercial vehicle volumes which have been under pressure in recent times. However, this slowdown may be short lived and demand may pick up, led by pre-buying in response to the changes in emission norms as well as a pickup in overall economic activity

4.2. Consumption-related sectors like consumer durables, FMCG, etc:

The outlook is near-term negative as cash sales account for a significant chunk of sales for companies in these sectors. As customers and companies migrate to the cashless platforms, demand should come back making demonetization near term neutral. In the long term, demand may shift from the unorganized players to the organized players.

- **GDP:**

According to the government's latest growth estimates, the pace of growth will be impacted by slowing growth in the manufacturing and mining sectors and also construction activity. This estimate is in line with the forecast of India's central bank, Reserve Bank of India, which in its last monetary policy had forecast GDP growth to be at 7.1 percent for the twelve months ending March. But this latest estimate does not consider the impact demonetization on the economy, "in the absence of sufficient information." While releasing the data, Chief

Statistician **T C A Anant** said the figures for November were available and examined but "it was felt in view of the policy of demonetization of notes there is a high degree of volatility in these figures and conscious decision was taken not make projection using the November figure".

This latest government estimate has been released almost a month before the standard release date of February 7. According to the data released Friday January 6th: "the Gross Value Added (GVA) at basic prices for 2016-17 from the mining and quarrying sector is estimated to decline by 1.8 percent, as compared to growth of 7.4 percent in 2015-16," a statement from the Central Statistics Office of the government said Friday evening. The GVA at basic prices for 2016-17 from the manufacturing sector is estimated to grow by 7.4 percent, compared to growth of 9.3 percent in 2015-16, the data showed. The private corporate sector has a share of around 72 percent in the manufacturing sector.

5. RESEARCH METHODOLOGY:

Type of Data

The present study is quantitative in nature and secondary data will be used for the purpose of analysis.

Source of Data

The present study is based on secondary data. The sources of data include the facts released by Reserve Bank of India (RBI), Exchange, Central statistics office India and Different banks websites.

6. FACT AND FINDINGS:

6.1. Impact of Demonetization on Agriculture Sector:-

Agricultural growth in India contracted 0.2% in 2014-15 and grew no more than 1.2% in 2015-16, largely because of back-to-back droughts. It was expected to grow at 4% in this year as per **CRISIL** Report, but due to Demonetization this forecast is proven wrong because Farmers are running out of Cash to buy Seeds, Fertilizer, Equipments, and Wages payment to workers and Commission to Agents etc. Because of Cash shortage daily supply transport system has also suffered which was result in 25 to 50 % reduction in sales. Following is the main reasons;

- Farmers are not educated and aware about how to work on E-Payment System, Recent study by RBI Says 78% of the population do not use internet in which almost 80 to 85 % are Farmers.
- In most of the Villages Proper Banking system is not Developed yet and Villagers are need to go to the cities for the same because of that Farmer's most of the time is engaged in exchanging the old notes in Banks.

6.2. Impact of Demonetization on Business sector:-

As per the study IPP says Growth in Business sector 0.7% in October 2016 but after 8th Nov.2016 Demonetization shows a different picture because of this decision labour turnover is also increased as lack of Production because of law demand of products people were purchase only if it necessarily required, for this I have studied on following business sector

- **Textile industry :-**

Most of the Brands and Retailers Report 40 to 60 % drop in sales after Demonetization in first few weeks but from December onwards this drop is slightly decrease, but still we can say the impact of this decision has affect the industry in 2017 also for at least 3 to 4 months.

- **Real Estate :-**

Demonetization smashed the real estate market and it will result in 50% drop down and it will remain for further 5 to 6 months. While the short-term impact is negative, Experts hoping that rate cuts in the coming months would boost home sales.

- **FMCG Products :-**

Consumer expenditures also affected by that decision now only those products are purchased which was necessary for daily consumption and mostly the small traders like '_kirana store', '_small bodies', '_thelawala' etc. they all have done their daily transactions only in cash and because consumer has less cash in his pockets the daily sells of these traders drop down by 20 to 30 %. It is also a short term impact in future things get normal.

6.3. Impact of Demonetization on Service Sector:-

Service sector is hit very heard by Demonetization decision in November 2016 worst Slump in nearly three year is noted. **The Nikkei India Services Purchasing Managers' Index (PMI)**, which tracks services sector companies on amonthly basis, stood at 46.7 in November, down from 54.5 in October. The Index slipped into contraction territory for the first time since June 2015 and pointed to the sharpest reduction in output for almost three years.

On other hand if we talk about Banking Sector this is the only sector which was benefited by that decision in many aspects, this move will pull a large chunk of first time users to banks, who will have to use the system at least once to exchange their old notes for new ones. According to a study conducted by **Moody's**, people tend to continue using banking services once they have crossed the 'first-time user' mark. This development will increase bank deposits by 1 to 2 percent compared to what they were before the demonetization scheme.

7. CONCLUSION:

The present study shows the impact of Demonetization on Indian economy's different sectors. GDP of Country slightly decreases as compare with the previous year but we cannot say it will be same in future also. —This intervention is a one-time draining of this current stock of black money but unless the root causes of corruption are removed, corruption will continue. It is sort of like a dialysis, more of a short term cleaning up than a solution of the problem. It needs to be repeated periodically. After study of Demonetization following questions raised for the year 2017.

- What was the impact of Demonetization in 2017 on Indian business sector?
- What could be the next step of Government after Demonetization?
- What will be the impact of Demonetization on GDP in short term and long term?
- To what extent the step of Demonetization has curb issues like black money, Corruption, fake Currency and Terrorism?
- How this step will affect the employment generation opportunities?

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“Investors’ Perception towards Volatility for Strategizing Financial Products

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Abstract: *The primary objective of the study is to examine the perception of the investors towards the extent of the volatility caused by different macroeconomic factors on stock behavior in Indian context. Investors’ appetite for risk or the volatility tolerance level is a key factor in designing or strategizing financial products. The question that whether macroeconomic variables relate to and forecast stock market volatility is important for investors, macroeconomists, and policy makers and majorly to the providers of financial services and products. The answer to this question will enable the portfolio managers and investors; both local and foreign to design efficient investment products and make effective investment decisions. To serve the intended purpose data was collected from retail investors with the help of a questionnaire which is circulated around in Navi Mumbai and Thane district to 200 investors, who have responded to the questions covering the information with respect to the perception of the investors towards the macroeconomic factors in general affecting the investment pattern of the investors, affecting the stock market activity and affecting their investment decisions. With the help of certain nonparametric test it was concluded that investors have a different perception towards the volatility caused by certain macroeconomic variables on stock market behavior and these factors should be factored in while strategizing for financial products and services.*

Key Words: *strategizing, macroeconomic performance, stock market volatility, investors’ perception*

I INTRODUCTION:

Investment is the current commitment of funds towards any financial or non-financial instruments in order to gain profitable returns at any future date. This return may be in the form of interest, income or appreciation in the value of the instrument. An investment is always made with certain specific objectives in mind. These objectives are primarily classified as the primary and secondary objectives. While the primary objectives revolve around the risk and return part of an investment decision, the secondary objectives include the safety against inflation, liquidity, growth, tax benefit etc. An investor with or without investment knowledge is always subconsciously alert and clear with his or her investment objectives. With the rising trend of fund management services all around the world, it becomes indispensable to have a very good understanding of how an investor thinks and responds to different investment avenues. Behavioral finance involves psychological impact on investment decisions. An investor’s psychology significantly affects the market imperfections, in view of the information asymmetry and the ability of investors to discount the information available at a specific point of time at a specific place. It has always been evident that investors’ sentiments influence the stock market heavily. Behavioral finance also claims that certain effects of emotions and social influence lead to discrepancy between market price and fundamental value as people often suffer from emotional and cognitive biases leading to any kind of irrational behavior.

The study of the stock market leads to the study of behavioral finance. It can be significantly stated that behavioral finance is essential for successful investment management. This field can be further developed by exploring behavioral related issues amongst investors and studying more about their perceptions relating to the factors untouched and unexplored. Stock market is one of the most interesting and inquisitive area for investors who always want to create massive wealth in the shortest time phase since stocks are the most wonderful category of financial instruments and one of the greatest tools ever invented for building financial wealth. Investors are the key stakeholders in the stock markets

operations. There perception and attitude towards anything related to stock market is of utmost importance. A substantial amount of research studies have been conducted which had analyzed the perception of the investors towards different investment avenues, investment risk and towards the working of a stock market. The perception of investors differs around on the basis of different factors like age, income, experience of investing, investment objectives and individual social needs. The stability of the market, to a larger extent depends upon the behavior of the investors. This behavior includes their perception and attitude towards stock markets which makes them to perceive stock market as a better investment options than other avenues. Investors' perception and attitude had been studied with respect to various factors affecting their investment decisions as these factors play an important role in strategizing financial product and services. But no such study has been observed where the perception of the investor has been studied and analyzed with respect to the volatility caused by macroeconomic performance on stock behavior. It is difficult but not an impossible task to study the understanding of the investors towards such phenomena with more investors gaining stock market knowledge. Such a study is a possibility today with more and more investors doing market study before investing. Moreover a study of this kind would be definitely of great help to fund management companies and for financial planners who will seek this to understand the awareness level of the investors and would able to build investment strategies accordingly. Section II presents the study of the available literature in this respect. Research methodology adopted in the study is explained in section III. Section IV consists of the data analysis and interpretation followed by findings and conclusion in section V.

2. LITERATURE REVIEW:

There is a substantial change in investment strategies used by active investors in Indian stock market over the past five years. In a nutshell there has been a shift from purely technical analysis based strategies to the one which involves both fundamental and technical analysis. Moreover the investment horizon of investors has also reduced due to higher volatility. Investors use both fundamental as well as technical analysis while investing in Indian stock market. They strongly agree that various company fundamentals significantly influence stock prices in India. The most worthy investment strategies in Indian stock market are buying stocks for which some good news is expected, buying stocks which are expected to announce bonus issue, momentum strategy, size strategy and following investment behavior of FIIs. (Tripathi, 2008)

In a different approach **Ducassy and Jeannicot (2008)** studied the impact of CSR information on investors' behavior. The study was conducted for a period of three years where a sample of 50 companies was analyzed and to represent the CSR part, the social reporting rankings generated by an independent body were used. The result revealed a market response to this rankings and a significant impact was observed for those companies that have risen or regressed the most in rank since the previous year. Thus the importance that the investors attribute to companies CSR dynamics was proved.

Abdelkarim et al (2009) investigated the perception of users regarding the availability, adequacy, and usefulness of information disclosed in the financial reports of companies listed on the Palestine Securities Exchange (PSE). It was found that the income statement, balance sheet, and the cash flow statement were the most important sections of the financial reports to most of the user groups. The auditor report and accounting policies were found to be the least popular. A high degree of importance was attached to all disclosure items expected to be reported in the financial reports under the IFRS and the PSE disclosure requirements, with more emphasis placed on performance items.

Bennet and Salvam (2010) analyzed the investors' perception towards Social, Political, Economical, Regulatory, Technological, Environmental and Legal (SPERTEL) risks on the value of equity shares in the market. It was also observed that except for the social factors between married and unmarried investors, political, regulatory and legal factors for age and occupation, all other factors were insignificant. The findings could be complemented by further investigation in the areas of other internal factors.

Talati and Sanghvi (2010) made an attempt to identify the awareness and perception of the investors' towards hedge funds as an investment avenue with special reference to Gujarat state. It was found that the awareness level regarding hedge funds was very less in area covered for study. The investors were not aware of the advantage that they could get by investing in hedge funds nor were they aware of the basic functioning of hedge funds. Investors in Gujarat preferred to invest in government securities and fixed deposits of nationalize banks were they had complete safety of their funds though they got less returns. Long term experience, knowledge of financial principles, the qualifications of investors who manage the firm, past performance of the stock and the analysis of disclosed financial statements increase the investors' confidence. Experience exerts statistically significant positive effect on overconfidence. With time-tested strategies investors get overconfident and their experience with these strategies always increases their confidence. This psychological aspect was explored through regression analysis on the Jordanian investors. It was shown that the Jordanian

investors are overconfident of their trading skills and investment decisions they make through strategic planning as per Alrabadi *et al* (2011)

The personal profiles of investors such as age, educational qualification, profession, annual family income and quantum of monthly savings have direct influence over the investors in making mutual fund investment decisions. Thus it is suggested that the mutual fund companies must endeavor to design their schemes and promotional activities in such a way to attract the most promising segment, based on personal profile, of investors as well as find ways and means to reach the non-promising segments too. (Geetha and Ramesh, 2011)

Bennet *et al* (2011) identified the factors that influenced the stock selection decision and also studied the demographic factors affecting the same. . It was revealed that the average value of the five factors, namely, Return on Equity, Quality of Management, Return on Investment, Price to Earnings Ratio and various ratios of the company influenced the decision makers. Also, other five factors, namely, Recommendation by Analyst, Broker and Research Report, Recommended by Friend, Family and Peer, Geographical Location of the Company and Social Responsibility were rated on the lower side and had low influence on the stock selection decision by the retail investors.

Investors' perception and attitude has been studied with respect to different investment strategies used in the stock market, factors influencing their investment decisions and the CSR dynamics of the companies. Moreover the awareness level of the investors towards the different types of funds and their investment approach has also being attempted. This study intends to examine the perception of the investors towards the extent of the volatility caused by the different macroeconomic factors on stock behavior in Indian context.

3. RESEARCH METHODOLOGY:

3.1 Statement of the problem: To study the perception of the investors towards the volatility caused by macroeconomic performance on stock market behavior for strategizing financial products.

3.2 Objective: The broad objective of the study is to study the perception of investors towards the volatility caused by macroeconomic performance on stock behavior in Indian context.

3.3 Scope of the study: The scope of the study is limited to the investors available in Navi Mumbai and few from Thane district.

3.4. Data: A survey has been conducted for the collection of the primary data. The survey is conducted in Mumbai for the investors available in Navi Mumbai and Thane district. A personally administered questionnaire is used to elicit information from the respondents consisting of retail investors. Also to collect the information, much attention has been paid towards the understanding of the questionnaire by the investor respondent, which means that investors with practical investment knowledge are selected.

3.5 Sampling: Investors are selected randomly and on the basis of their hands on knowledge of investment and an understanding to macroeconomic environment. The sample size is 200 investors which is similar to the sample size used in other research works.

3.6 Hypothesis of the study: Investors perceive macroeconomic variables causing stock market volatility differently. This is split into various other sub hypotheses based on the analytical techniques applied.

4. METHOD OF ANALYSIS:

Cross tabulation and percentage difference calculation is done for:

- Age and Objectives of Investing
- Occupation and Objectives of Investing
- Monthly Income and Objectives of Investing
- Investment Experience and Objectives of Investing Chi-square test has been used in the study to test the following:
 - To test the goodness of fit of observed frequency distribution with the expected one, of macroeconomic variables substantially followed to assess the stock market performance.
 - To test the goodness of fit of observed frequency distribution with the expected one, of macroeconomic variables substantially affecting the investment behavior in the stock market.
 - To test the goodness of fit of observed frequency distribution with the expected one, of macroeconomic variables having a substantial impact on the stock market performance.
 - To test the goodness of fit of observed frequency distribution with the expected one, of macroeconomic variables having a substantial impact on the volatility in the stock market.

- Kruskal-Wallis test has been used to find out whether any significant difference exist between the perception of the investors towards the macroeconomic factors;
- Substantially followed to assess the stock market performance.
- Substantially affecting the investment behavior in the stock market.
- Having substantial impact on the stock market performance.
- Having substantial impact on the volatility in the stock market.

4.1 Limitation of the study: The researcher has assumed all the limitations of nonparametric tests. The method applied to study the perception of the investors towards the volatility caused by macroeconomic performance on stock market behavior are nonparametric in nature which do not require the population to be normally distributed or with equal variances.

5. DATA ANALYSIS AND INTERPRETATION:

5.1. Cross tabs: To present the information of the investors and the statistics related to the data reported cross-tabs had been used. Table 5.1 shows the distribution of respondents as per age, income, occupation and market experience. 32 percent of the investors belong to the age group of less than 25 and between the ages of 25-35 each; 32 percent and 30 percent of investors belong to the income group of 20000-30000 and 40000-50000. 40 percent of the investors belong to the category of others in occupation while 42 percent of the investors have less than 5 years of market experience.

Table 5.1

Distribution of Respondents

Age	No. of Resp.	Income	No. of Resp.	Occupation	No. of Resp.	Market. Exp (Years)	No. of Resp.
< 25	64	<20000	4	Service	56	<5	84
25-35	64	20000-30000	64	Professional	40	5-10	36
35-45	20	30000-40000	16	Business	24	10-15	60
45-55	32	40000-50000	60	Others	80	>15	20
>55	20	>50000	56	-	-	-	-
Total	200		200		200		200

Source: Survey Data

5.2. Chi-Square Test: Chi-Square test was performed to test for any significant difference between the expected and observed frequency of these variables viz. FII, EXCRATE, IIP and WPI on the four different aspect of their impact on stock market performance and volatility. The results are displayed from Table 5.2 to Table 5.9 It was expected that more than 90% of the population would be agreeing and less than 10% of the population would be disagreeing on the different . aspect of their impact on stock market performance and volatility.

The different hypotheses tested are as follows:

H₁: There is a significant difference between the expected and observed frequencies of macroeconomic variables substantially followed to assess the stock market performance.

Table 5.2

Frequency Distribution of Macroeconomic Variables

Categories	Variables			
	FII	EXCRATE	WPI	IIP
Strongly Disagree	0	0	8	0
Disagree	8	12	20	12
Neither Agree nor Disagree	16	12	24	64
Agree	72	96	40	64
Strongly Agree	104	80	108	60
Total	200	200	200	200

Source: Survey Data

Table 5.3
Test Statistics: Chi-Square Test of Goodness of Fit for FII, EXCRATE, WPI and IIP

	FII followed	EXCRATE followed	WPI followed	IIP followed
Chi-Square ^a	4.178	7.911	4.640	110.400
Df	3	3	4	3
Asymp. Sig.	.243	.048*	.326	.000*

Source: SPSS Output

a 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0 and 5.0.

* Significant at 5% level of significance

H₂: There is a significant difference between the expected and observed frequencies of macroeconomic variables substantially affecting the investment behavior in the stock market.

Table 5.4
Frequency Distribution of Macroeconomic Variables

Categories	Variables			
	FII	WPI	EXCRATE	IIP
Strongly Disagree	0	0	0	4
Disagree	4	4	12	12
Neither Agree nor Disagree	16	36	20	60
Agree	84	48	68	44
Strongly Agree	96	112	100	80
Total	200	200	200	200

Source: Survey Data

Table 5.5
Test Statistics: Chi-Square Test of Goodness of Fit for FII, WPI, EXCRATE and IIP

	FII followed	WPI followed	EXCRATE followed	IIP followed
Chi-Square ^a	5.000	34.578	3.311	41.360
Df	3	3	3	4
Asymp. Sig.	.172	.000*	.346	.000*

Source: SPSS Output

a 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0 and 5.0.

* Significant at 5% level of significance

H₃: There is a significant difference between the expected and observed frequencies of macroeconomic variables having a substantial impact on the stock market performance.

Table 5.6
Frequency Distribution of Macroeconomic Variables

Categories	Variables			
	FII	WPI	EXCRATE	IIP
Strongly Disagree	4	0	0	4
Disagree	4	4	20	8
Neither Agree nor Disagree	12	28	28	44
Agree	56	60	48	60
Strongly Agree	124	108	104	84
Total	200	200	200	200

Source: Survey Data

Table 5.7

Test Statistics: Chi-Square Test of Goodness of Fit for FII, WPI, EXCRATE and IIP

	FII followed	WPI followed	EXCRATE followed	IIP followed
Chi-Square ^a	40.800	15.400	28.178	30.853
Df	4	3	3	4
Asymp. Sig.	.000*	.002*	.000*	.000*

Source: SPSS Output

a 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0 and 5.0.

* Significant at 5% level of significance

H₄: There is a significant difference between the expected and observed frequencies of macroeconomic variables having a substantial impact on the volatility in the stock market.

Table 5.8

Frequency Distribution of Macroeconomic Variables

Categories	Variables			
	FII	EXCRATE	WPI	IIP
Strongly Disagree	4	0	0	8
Disagree	4	12	8	4
Neither Agree nor Disagree	16	20	28	52
Agree	60	48	60	44
Strongly Agree	116	120	104	92
Total	200	200	200	200

Source: Survey Data

Table 5.9

Test Statistics: Chi-Square Test of Goodness of Fit for FII, EXCRATE, WPI and IIP

	FII followed	EXCRATE followed	WPI followed	IIP followed
Chi-Square ^a	36.933	23.200	10.778	36.613
Df	4	3	3	4
Asymp. Sig.	.000*	.000*	.013*	.000*

Source: SPSS Output

a 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0 and 5.0.

* Significant at 5% level of significance

Kruskal –Wallis Test: The test is applied to know if any difference exists between the groups which are based on some or the other way investors perceive these macroeconomic variables.

H₅: There is a significant difference between the perceptions of the investors towards the macroeconomic factors based on four groups.

The mean ranks of all macroeconomic variables under the four groups are given in Table 5.10

Table 5.10

Mean Ranks of Macroeconomic Variables

GROUPS	N	Mean Rank							
		GDP	EXCRATE	IIP	WPI	FII	FDI	CAD	MS
1	200	413.30	374.82	367.94	383.66	388.10	417.18	413.26	364.02
2	200	385.54	401.22	391.26	409.78	377.98	408.54	385.02	372.86
3	200	435.42	391.54	420.70	409.86	426.74	382.02	421.66	414.94
4	200	367.74	434.42	422.10	398.70	409.18	394.26	382.06	450.18

Source: SPSS Output

The calculated value of kruskal - wallis test statistic for all the macroeconomic variables against the four groups is given in Table 5.11

Table 5.11
Kruskal – Wallis Test Statistics ^(a,b)

	GDP	EXCRATE	IIP	WPI	FII	FDI	CAD	MS
Chi-Square	11.651	8.476	8.417	2.099	6.722	3.011	4.992	21.455
Df	3	3	3	3	3	3	3	3
Asymp. Sig.	.009*	.037*	.038*	.552	.081**	.390	.172	.000*

Source: SPSS Output

^a Kruskal Wallis Test

^b Grouping Variable: GROUPS

* Significant at 5% level of significance

**Significant at 10% level of significance

6. FINDINGS AND CONCLUSION:

Capital Appreciation is the prime objective of the investors irrespective of age, occupation, income and market experience who also feel the least preference for speculation as an objective of investing on account of increased market efficiency. Inflation and retirement planning are never the highest priority of the investors while a higher return is never a low priority of investors. Financial products should appeal to these objectives while strategizing. Investors agree to a larger extent that certain macroeconomic indicators like FII, EXCRATE, WPI and IIP are substantially followed to assess stock market performance, affect the investment behavior and have an impact on stock market performance and volatility. More than 90 percent of the investors feel that FII and WPI are substantially followed to assess the stock market performance while FII and EXCRATE are substantially affecting the investment behavior in the stock market. These variables should be factored in the overall designing, strategizing and advertising of financial products. GDP, EXCRATE, IIP, FII and MS are being perceived differently by the investors with respect to these indicators following, effect on investment behavior and impact on stock market performance and volatility while no such difference was observed in case of WPI, FDI and CAD. Thus investors have a different perception towards the volatility caused by certain macroeconomic variables on stock market behavior.

6.1 Scope for future research:

Investors' perception can be studied with respect to foreign investor's investment in India which will give AMC's better insight into the motives and behavior of foreign investors and will further aid in development and strategizing of financial products which will meet the purpose. A more robust study can be made, highly concentrating on the study of investors' perception and behavior using the parametric group of tests which will have a better approach and understanding of investors' investment decision making.

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Role and Compliance Of GST In Enhancing Credit Rating Services

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Abstract: A credit rating is an evaluation of the credit risk of a prospective debtor like an individual, a business, company or a government, estimating their ability to repay the debt, and an implicit estimates of the likelihood of the debtor defaulting. The credit rating represents an amount of a credit rating agency of the qualitative and quantitative facts for the prospective debtor, including information provided by the prospective debtor and other non-public information established by the credit rating agency's analysts. The Goods and Services Tax (GST) is a value-added tax applied on most goods and services kept for domestic consumption. The GST is paid by consumers, but it is dispatched to the government by the businesses selling the goods and services. In effect, GST provides revenue for the government. The objective of the study is to analyze the role of Goods and Services Tax in enhancing credit rating services. The study reveals how the GST Rating works. Analytical type of research is used for the study. Secondary as well as primary data has been gathered for the study. The sources for the data are through the websites of the rating agencies, news and journals on GST. The study briefly explains the effects of adopting GST. This helps all types of customers in knowing the advantages of GST in compliance rating by which they can make perfect use of it. The study describes the advantages and disadvantages and limitations of compliance of GST.

Key Words: Credit Rating, Credit Rating Agencies, GST, Customers, Government, Services

1. INTRODUCTION:

GST guided in a new India on 1st July 2017. India never saw such a huge tax reform before. GST has also brought in new concepts such as mixed and composite supply, time of supply and most importantly the GST Compliance Rating. Simply, the GST compliance rating is similar to a performance ranking of all registered taxable persons which tells us how compliant they are with respect to the GST provisions. This will be regardless of nature, size, or turnover of the business. The idea behind this concept of tax administration is to compel people to be fully GST compliant and on time with uploading invoices and other necessary documents.

2. DEFINITION:

2.1. CREDIT RATING:

Credit rating refers to knowing the credit assess ability of customers that means knowing the credit repayment history of the customer. Credit rating is used by all the customers who would like to seek loan facilities.

2.2. CREDIT RATING AGENCIES:

Credit rating constitutes an opinion of a rating agency that evaluates the basic credit strength of an issuer and his ability to fully and punctually meet his debt obligations. Credit Rating indicates the credit worthiness of the borrowers and the likelihood of the borrowers will repay the interest and principal on due dates

2.3. GOODS AND SERVICES TAX:

The Goods and Services Tax (GST) is a value-added tax applied on most of the goods and services that are used for domestic consumption. The GST is paid by consumers, but it is forwarded to the government by the businesses selling the products and services. In effect, GST provides revenue for the government also known as Value-Added Tax (VAT) in some countries.

2.4. ORIGIN OF CREDIT RATING AGENCIES AND GST:

The Credit Rating Agency was first established in 1841 by Lewis Tappan in New York City. It was subsequently acquired by Robert Dun, who published its first ratings guide in 1859. Another early agency, John Bradstreet, started in 1849 and published a ratings guide in 1857. Credit rating agencies took birth in the United States in the early 1900s, when ratings began to be applied to securities, specifically those related to the railroad bond market. In the United States, the construction of extensive railroad systems had led to the development of corporate bond issues to finance them, and therefore a bond market several times larger than in other countries. The bond markets in the Netherlands and Britain had been established longer but tended to be small, and revolved around sovereign governments that were trusted to honor their debts. Companies were founded to provide investors with financial information on the growing railroad industry, including Henry Varnum Poor's publishing company, which produced a publication compiling financial data about the railroad and canal industries. Following the 1907 financial crisis, demand rose for such independent market information, in particular for independent analyses of bond creditworthiness. In 1909, financial analyst John Moody issued a publication focused solely on railroad bonds. His ratings became the first to be published widely in an accessible format, and his company was the first to charge subscription fees to investors.

THE BIG THREE AGENCIES:

- *FITCH John Knowles Fitch started this Fitch Publishing Company in 1913; He was a 33-year-old entrepreneur when he took his father's printing business. He used to have a unique goal for his company: to publish financial statistics on stocks and bonds.*

In 1924, Fitch expanded the services of his business by creating a system for rating debt instruments based on the company's ability to repay their obligations. Although Fitch's rating system of grading debt instruments became the standard for other credit rating agencies, Fitch is now the smallest of the "big three" firms.

- *STANDARD & POOR Henry Varnum Poor was a financial analyst with a similar vision to John Knowles Fitch. Like Fitch, Poor was interested in publishing financial statistics, which inspired him to create H.V. and H.W. Poor Company.*

Luther Lee Blake was another financial analyst interested in becoming a financial publisher. In order to achieve this dream, Blake founded Standard Statistics in 1906, just a year after Poor's death. Standard Statistics and H.V. and H.W. Poor published very similar information. Hence, it made sense for the two companies to consolidate their assets, and they merged in 1941 to form the Standard and Poor's Corporation.

Today, Standard and Poor's not only provides ratings but also offers other financial services, such as investment research, to investors. They are now the largest of the "big three" rating agencies.

- *MOODY'S John Moody was the founder of the financial holding company, Moody's Corporation, in 1909. Although Moody's provides many services, one of their largest divisions is Moody's Investor Services. While Moody's has conducted credit ratings since 1914, they only conducted ratings of government bonds until 1970. Moody's has grown significantly over the years. Presently, Moody's is the second largest of the "big three" firms.*

2.5. GOODS AND SERVICES TAX (GST):

The tax came into effect from July 1, 2017 through the implementation of one hundred and one amendments by the Government of India. The tax replaced many existing multiple cascading taxes that make the way by the central and state governments. The tax rates, rules and regulations are governed by the Goods and Services Tax Council which comprises of finance ministers of centre and all the states. GST simplified a slew of indirect taxes with a unified tax and is therefore expected to dramatically reshape the country's 2 trillion dollar economy.

3. OBJECTIVES OF THE STUDY:

- The main objective of the study is to render a certainly third party opinion on the capabilities and creditworthiness of the customers.
- To create awareness amongst customers about the strengths and weakness of their existing operations.
- To know about the complete information about the effects of GST on credit rating
- To study the role played in adopting GST for credit rating
- To provide them an opportunity to improve & enhance their organizational strengths and Credit worthiness, so that they can access credit at a very cheaper rates and on easy terms.

3.1. SCOPE OF THE STUDY:

The scope explains the theoretical aspects and effects of GST on credit rating. The study has been carried on the effectiveness of GST on credit rating agencies. The study considered only the advantages and disadvantages and the role played.

4. RESEARCH METHODOLOGY:

Both analytical research and descriptive research were used in accomplishing the objective of the study. As analytical research, the researcher has to use the already available facts or information to make a critical evaluation. Descriptive research is describing the state of affairs as it prevails at the time of study. In this study the researcher gathered the data from websites and made conclusions from it.

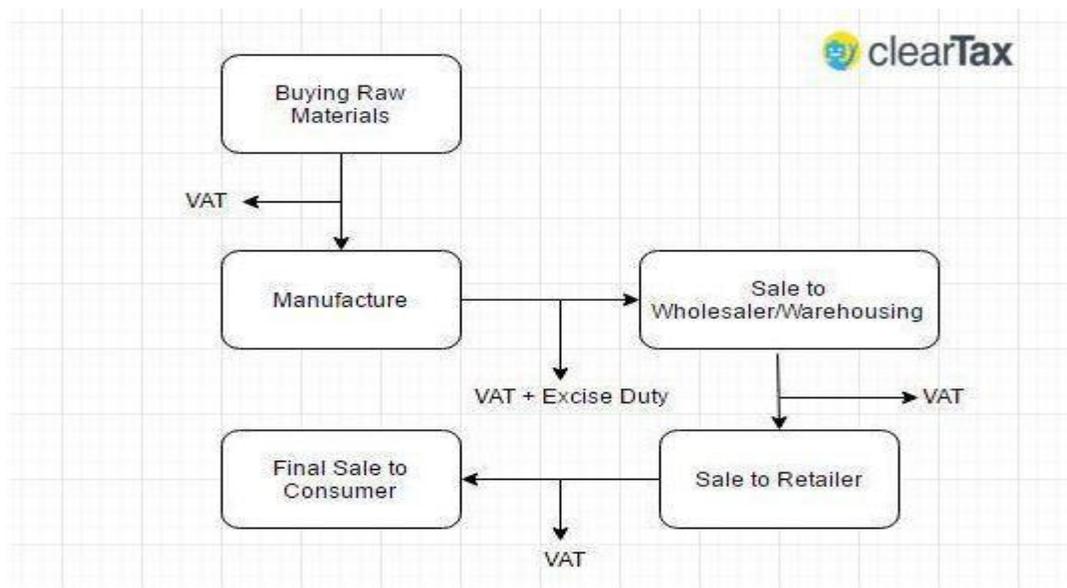
4.1. SOURCES OF DATA:

- **Primary data:** Data gathered by personal interactions with the people of credit rating agencies.
- **Secondary data:** Data from websites, newspapers, journals, books, credit rating agencies is used for the study.

5. REVIEW OF LITERATURE:

- **Bheemanagauda and Madegowda (2010)** made an attempt to evaluate the performance of credit rating agencies in India including CRISIL, ICRA, CARE and FITCH. Secondary data relating to long-term debt instruments have been used for the purpose of the study.
- **Herwig; Patricia Langohr (2010)** Credit rating agencies play a critical role in capital markets, guiding the asset allocation of institutional investors as private capital moves freely around the world in search of the best trade-off between risk and return. However, they have also been strongly criticized for failing to spot the Asian crisis in the early 1990s.
- **Hagaragi, S. B. (1998)**, has undertaken research on “Rationalization of personal taxation: A study on salary Income” in Gulbarga university, Gulbarga. The researcher discusses the various components of salary under the provisions of Income Tax Act.
- **John Mathai Committee (1953)** the taxation enquiry was appointed by the government of India on April 1, 1953 under the chairmanship of John Mathai. The terms of references of the commission were to examine the incidence and suitability of Central, State and Local taxation on various classes of people.
- **Robert and Gary (1994)** state that the most obvious characteristics of failed banks is not poor operating efficiency, however, but an increased volume of non-performing loans. Non-performing loans in failed banks have typically been associated with regional macroeconomic problems

5.1 BEFORE GOODS AND SERVICE TAX, THE PATTERN OF TAX LEVY WAS AS FOLLOWS:



Under the GST regime, the tax will be levied at every point of sale. In case of interstate sales, Central GST and State GST will be charged. Intra-state sales will be chargeable to Integrated GST.

5.2. GENERAL FACTORS WHICH EFFECT CREDIT SCORING:

- The agency takes into account the individuals past history of borrowing and paying off debts. If any payments are missed or defaults on loans impact the ratings negatively.

- The agency also looks at the businesses future economic capability. If the economic future looks bright, the credit rating tends to be higher; if the borrower does not have a positive economic outlook, the credit rating will decrease.
- The credit rating is carried to individuals by source of a numerical credit score that is maintained by Equifax, Experian, and other credit-reporting agencies. A high credit score indicates a stronger credit profile and will generally result in lower interest rates charged by lenders.
- There are a number of factors that are taken into account for an individual's credit score including payment history, amounts to be repaid, and length of credit history, new credit, and types of credit. Some of these factors have greater weight than others. Details on each credit factor can be found in a credit report that which explains about a credit score.

5.3. ADVANTAGES OF GST ON CREDIT RATING SERVICES:

- GST is a clear tax and also decreases number of indirect taxes.
- GST will not be a cost to registered retailers therefore there will be no hidden taxes and the cost of doing business will be lower.
- Benefits people as, when prices come down which in turn helps companies as consumption will increase.
- There is no doubt that in production and distribution of goods, services are increasingly used or consumed and vice versa.
- Separate taxes for goods and services, which is the present taxation system, requires division of transaction values into value of goods and services for taxation, leading to greater complications, administration, including compliances costs.
- In the GST system, when all the taxes are integrated, it would make possible the taxation burden to be split equitably in between manufacturing and services.
- GST will be applied only at the final maturity of consumption based on VAT principle and not at various points (from manufacturing to retail outlets). This helps in removal of economic distortions and brings about development of a common national market.
- GST will also help to build a transparent and corruption free tax administration.
- Presently, a tax is levied on when a finished product moves out from a factory, which is paid by the manufacturer, and it is again levied at the retail outlet when sold.
- GST is backed by the GSTN, which is a fully integrated tax platform to deal with all aspects of GST.

When there is no indirect tax burden on investors, then they could invest more into new business leading to increasing GDP and economic development.

5.4. DISADVANTAGES OF GST ON CREDIT RATING SERVICES:

- Some Economist says that GST in India would impact negatively on the real estate market. It would add up to 8 percent to the cost of new homes and reduce demand by about 12 percent.
- Some Experts says that CGST (Central GST), SGST (State GST) are nothing but new names for Central Excise/Service Tax, VAT and CST. Hence, there is no major reduction in the number of tax layers.
- Some retail products presently have only four percent tax on them. After GST, garments and clothes could become more expensive.
- The aviation industry would be affected. Service taxes on airfares recently range from six to nine percent. With GST, this rate will surpass fifteen percent and effectively double the tax rate.
- Adoption and migration to the new GST system would involve teething troubles and learning for the entire ecosystem.

There is a negative effect on real estate which leads to decreasing constructions, selling and buying of assets. Gradually all the inputs related to construction sector and real estate sector will increase.

5.5. REPORT ACCORDING TO MOODY ABOUT GST TO INDIAN ECONOMY:

Global ratings agency Moody's recently said that the Goods and Services Tax (GST) result will be positive for India's credit profile as it will contribute to productivity gains and higher GDP growth as well as support higher government revenue generation through improved tax compliance. Meanwhile, premier industry body Confederation of Indian Industry (CII) said the Indian industry is prepared for the cause of the GST, adding that the result will help for the attention of doing business and start new business entities. According to William Foster, Vice president, sovereign Risk Group, Moody's Investors Service, over the medium term, the expectations that the GST would contribute in productive gains and higher GDP growth by improving the interest of executing business, equalizing the national market and

improving India's foreign investment destination. It would also support in generating high Government revenue by tax compliance and administration.

According to him, we expect improved tax compliance to be driven by:

1. Incentivisation of tax credits in a GST system
2. High interest of compliance through usage of a common, shared IT infrastructure between the central government and the states
3. A decrease in the cost of simplified tax rates, uniform across the country.
4. Government revenues expected to be positive with the impact of GST.

According to Shobana Kamineni, President, CII, says that Government continues to create investments and simplify the business environment. This leads to success of GST for boosting India's growth and development.

5.6. FACTORS WHICH PLAY A KEY ROLE IN DECIDING COMPLIANCE RATINGS:

1. Timely payment of taxes
2. Timely filing of returns
3. Timely reconciliations
4. Compliance with various other time limits under GST
5. Cooperating with the GST authorities

5.7. GOODS AND SERVICES TAX NETWORK (GSTN):

As per the government website on GST, "Goods and Services Tax" Network (GSTN) is a nonprofit organization proposed to be formed for creating a website / platform for all the concerned parties related to the GST, like stakeholders, government and taxpayers to collaborate on a single gateway. When up and running, the gateway is supposed to be accessible to the central government which allows it to lay down every transaction on its end while taxpayers are encouraged to have the ability of connecting this to their tax returns. However its efficacy and efficiency is yet to be tested. The known authorized capital of GSTN is ₹10 crore (US\$1.6 million) in which Central Government holds 24.5 percent of shares while the state government holds 24.5 percent and rest with private banking firms for smooth running of the transactions.

6. LIMITATIONS OF THE STUDY:

- The prevailing manual credit risk management systems are quite expensive and very difficult to maintain.
- The cost that is involved in maintaining the qualified, experienced and trained credit rating executives is very high.
- It is very uncommon for different types of investors to end up at common conclusion as to the relative quality of the instrument. Moreover they do not ensure the requisite skills of credit evaluation.

7. CONCLUSION:

- According to Moody there is a positive effect of GST on all the sectors as there are no added taxes to be paid.
- When fewer taxes are paid the remaining amount can be invested in other sources. For which they approach credit rating agencies for credit scores.
- This automatically increases the income of credit rating agencies.

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**‘Sanjyot-2018’ National Seminar on
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Kopargaon, Dist- Ahmednagar, Maharashtra, India,**

Emerging Innovations and Strategic Business Practices In Marketing

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Abstract: Organizations today have no option but to change and evolve. The change has to do with every aspect of business and not limited to any one aspect of its business. Those who are not able to see the trends and change themselves are perishing. Technology has been the single most important change agent. Technology has redefined all aspects of business. What we see today is the definitive shift of power from the Organization into the hands of the Customer. Marketing and related technology become the enablers to make this happen. Banks, Airlines, Insurance as well as Services like Pizza Hut, Macdonald’s are some of the businesses that have developed effective means to recognize and communicate with individual customers and thereby build an emotional connect with the customers.

Key Words: Organization, Marketing, Innovation, Strategy, Customer

1. INTRODUCTION:

Marketing is defined by the American Marketing Association as "the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large. The term developed from the original meaning which referred literally to going to market with goods for sale. From a Sales process engineering perspective, marketing is "a set of processes that are interconnected and interdependent with other functions" of a business aimed at achieving customer interest and satisfaction. The Chartered Institute of Marketing defines marketing as "the management process responsible for identifying, anticipating and satisfying customer requirements profitably. A similar concept is the value-based marketing which states the role of marketing to contribute to increasing shareholder value. In this context, marketing can be defined as "the management process that seeks to maximize returns to shareholders by developing relationships with valued customers and creating a competitive advantage. Marketing practice tended to be seen as a creative industry in the past, which included advertising, distribution and selling. However, because the academic study of marketing makes extensive use of social sciences, psychology, sociology, mathematics, economics, anthropology and neuroscience, the profession is now widely recognized as a science,¹ allowing numerous universities to offer Master-of-Science (MSc) programs. The process of marketing is that of bringing a product to market. As such, the steps include broad market research; market targeting and market segmentation; determining distribution, pricing and promotion strategies; developing a communications strategy; budgeting and visioning long-term market development goals. Many parts of the marketing process (e.g. product design, Art direction, Brand management, advertising, Copy writing etc.) involve use of the creative arts.

Innovation is the process of translating an idea or invention into a good or service that creates value or for which customers will pay. To be called an innovation, an idea must be replicable at an economical cost and must satisfy a specific need. Innovation involves deliberate application of information, imagination and initiative in deriving greater or different values from resources, and includes all processes by which new ideas are generated and converted into useful products. In business, innovation often results when ideas are applied by the company in order to further satisfy the needs and expectations of the customers. In a social context, innovation helps create new methods for alliance creation, joint venturing, flexible work hours, and creation of buyers' purchasing power. Innovations are divided into two broad categories:

Evolutionary innovations (continuous or dynamic evolutionary innovations) that are brought about by many incremental advances in technology or processes and **revolutionary innovations** (also called discontinuous innovations) which are often disruptive and new. Innovation is synonymous with risk-taking and organizations that create

revolutionary products or technologies take on the greatest risk because they create new markets. Imitators take less risk because they will start with an innovator's product and take a more effective approach. Examples are IBM with its PC against Apple Computer, Compaq with its cheaper PC against IBM and Dell with its still-cheaper clones against Compaq. Marketers in many industries know that innovation through new product development is vital to remain competitive. But product decisions are not the only areas affected by new developments. Innovation can affect almost all marketing areas. Below is a sampling of how innovation has affected different marketing areas:

Marketing Area	Effect of Innovation
Marketing Research	Creates new ways to conduct research including more sophisticated methods for monitoring and tracking customer behavior and analyzing data.
Targeting Markets	Allows for extreme target marketing where marketing-to-person is replacing mass marketing. For customer service, technology makes it easier to manage relationships and allows for rapid response to customer's needs.
Product	Creates new digital products/services. Incorporation of innovation into existing product/service enhances value by offering improved quality, features & reliability at a lower price.
Promotion	New techniques allow better matching of promotion to customer activity and individualized promotion. Makes it easier for sellers to offer product suggestions and promotional tie-ins.
Distribution	Creates new channels for distribution and transaction (e.g., electronic commerce) that include making it easier for buyers to place orders. Allows more control over inventory management and closer monitoring of product shipment
Pricing	Enables the use of dynamic pricing methods.

Many of the benefits shown above are driven by the evolution of the Internet. The Internet is transforming how all functional areas of an organization perform work. However, it can be argued that no functional area has been more affected than marketing. Throughout the Principles of Marketing Tutorials we have seen evidence of how the Internet has impacted marketing. Over the next decade it is expected that the Internet's effect on marketing will continue to grow and marketers are well served to embrace this.

2. RESEARCH WORK:

Being able to adapt to consumer behavior and new technologies while maintaining a strong customer focus is essential to great marketing. Creating an incredible customer experience means giving consumers what they may not even yet realize they want. How do IKEA, Virgin America, Instagram, Netflix, L'Oréal, McDonald's Canada, American Express, BuzzFeed, Marketo, Red Bull, Charmin, WestJet and The Furrow use innovation in their marketing campaigns? What is the defining quality of your brand's marketing strategy?

Perhaps, as in the case of GoPro, it's *synergy*. With a content strategy that perfectly complements their product, GoPro executes one of the most impressive marketing strategies in the world today. Or perhaps, as for many brands from SAP to Harley Davidson, it's the strength of your *brand community*, defined on the three pillars of feedback, advocacy and support. For Taco Bell, it's their *explorer mentality* which enables them to perform brilliantly when marketing on new platforms, focusing on how and where their audiences are seeking and consuming content. One quality that unites the marketing strategies of all of these brands is *innovation*. Effective digital marketing requires that brands have the ability to adapt to change and to grasp new opportunities. Being able to innovate allows brands to conceptualize new ideas and put them into practice. While innovation has been acknowledged as a fundamental quality for product and tech teams for some time now, innovative practices are also increasingly being applied to marketing. As HBR analyst Niraj Dawar put it: "*The persistent belief that innovation is primarily about building better products and technologies leads managers to an overreliance on upstream activities and tools. But downstream reasoning suggests that managers should focus on marketplace activities and tools. Competitive battles are won by offering innovations that reduce customers' costs and risks over the entire purchase, consumption, and disposal cycle.*"

Even in the purest of scenarios, the benefits of innovation for brand marketing efforts can be clear. Volvo, for example, established a reputation for being an innovator of automobile safety, a message that has been effectively reiterated in their marketing campaigns for decades. Dawar also cites the example of how Hyundai, having received feedback indicating that recession-hit consumers in the depths of the financial crisis were refraining from purchasing new automobiles due to job insecurity, offered an assurance program that enabled consumers to return a vehicle with no financial penalties if they lost their job or income within a year of buying a Hyundai vehicle. Innovative marketing is undoubtedly an exciting proposition. Let's look at a few great examples of brands employing innovative marketing practices today.

2.1 IKEA

IKEA has always had close ties with innovation. Founded in 1943 as a mail-order sales business, the company has grown into a global multinational spanning 46 countries, built on the unique USP, and the momentous commerciality, of ready-to-assemble furniture. IKEA's products are renowned for the level of detail that is put into their design – enabling their furniture to be easily assembled, often without tools – and equally it's in the detail of IKEA's marketing where the company is most innovative. The brand has put customer-experience at the heart of their marketing strategy, not just at individual needs and touchpoints, but across the *whole* buying cycle. They launched the Catalogue app, which not only gave users access to the company's inventory, but via augmented reality, actually allowed them to view how items would look in their home spaces. *The app is a great resource for customers in the consideration stage of the buying cycle.* Those who visit an IKEA store can look forward to a number of innovations designed to make create excellent shopping experiences. Parents of young families can benefit from babysitting for 60 minutes completely free of charge. Customers can also enjoy the in-store restaurants and bistros, for a taste of Swedish cuisine, and with breakfast available for as little as \$1, and family-friendly offers such as buy-one-get-one-free frozen yogurt, it's little wonder that IKEA's family memberships increased from 4.3 million to 6.9 million.

Perhaps most impressively of all, IKEA also make efforts to cater for customers' post-purchase needs, even though it may have no direct revenue return for the brand. In previous years, for example, they introduced a platform that helped customers sell their second-hand furniture, even going as far as helping users take photos and opening up the brand's Facebook page to act as an online marketplace. These are just a few examples. It's the collaborative impact of all of IKEA's efforts that makes their marketing so innovative. Initiatives have been staunchly focused on improving the complete buying experiences of their customers, without falling into established paradigms or typical processes. While many brands appreciate that customer experience is key to successful strategy, IKEA has managed to execute on a level of detail where numerous others fall short.

2.2. VIRGIN AMERICA

Virgin America operates in a competitive industry, where brand loyalty and customer service are the key. Naturally, feedback plays a crucial part, which is why Virgin introduced a focus group program, VX Next, a group of 30 frequent flyers and entrepreneurs who generate ideas for the airline in return for flyer rewards. As a direct result of their feedback, Virgin America introduced an in-flight social network enabling passengers to connect during the duration of a flight. The airline recently produced an incredible six-hour video detailing an entire in-flight experience on fictional Blah Airlines. The (incredibly) long-form content was supported by a website and accounts on social media channels including Twitter and Instagram. Creating a campaign around a fictitious company may have been unorthodox, but it gave the brand reach in a highly competitive market and the campaign certainly made its mark digitally, winning coverage for being one of the longest ads ever created.

2.3. INSTAGRAM

Instagram has a fantastic affinity with highly visceral industries such as fashion, where the brand has already forged a great number of strong partnerships. The platform has provided the industry with the ability to increase the depth of their storytelling and narratives, showing backstage photos, for example, or images of industry on the other side of the lens such as those of the photographers, make-up artists and bloggers. The platform has implemented innovative practices to improve user experiences within this niche. The "Explore" function displays personalized results of channels users are likely to be interested in and the app's Hyperlapse video recording features are perfect for creating time-lapsed videos of hair of make-up routines.

Recently, Instagram have massively ramped up the advertising provisions within the app with new app APIs. It's been a highly positive development and brands in the fashion as well as wider industries are beginning to enjoy the ability to share content, which users are engaging with just as they would with other contents. Today, 86 percent of the top global brands are active on the platform, which is a powerful endorsement for the validity of the platform as a marketing and advertising channel.

2.4. NETFLIX

Netflix has become a household name – no easy feat and one achieved largely because of the incredible quality of content produced by the brand. After all, Netflix isn't just a streaming service and distribution delivery platform. Netflix has also produced some of the most popular television series of recent years. Among the keys to Netflix's success has been the implementation of data and analytics of consumer viewing behavior and demand. An article in The Atlantic gives some insight on the huge commitment the brand made to “reverse engineer Hollywood”, and the stunning insights they were able to gain. In short Netflix “meticulously analyzed and tagged every movie and TV show imaginable. They possess a stockpile of data about Hollywood entertainment that is absolutely unprecedented.” It's no mystery that Netflix takes its data extremely seriously. Data informs their content and production endeavors, as well as their marketing. But analyzing their incredible data resources was just the first step. Netflix invested in organizing this data into ideas that can inform their content with a level of detail that is *incredibly* innovative.

2.5. L'OREAL

L'Oréal understands that providing for digital-era consumers pre-purchase, is just as important as allowing them to sample products at makeup stands and counters. For this reason they designed an app. L'Oréal's Makeup Genius app allowed users to use their phones to do a digital makeover. The brand recruited the same team behind the makeup of “The Curious Case of Benjamin Button” to provide the realistic visual effects needed. Consumers responded positively; the app was downloaded 7 million times. The brand has also displayed boldness in other digital channels, creating a unique line “Em-Cosmetics” for hugely influential makeup blogger Michelle Phan. As Lubomira Rochet, L'Oréal's Chief Digital Officer, stated in an interview with Ad Age: “What consumers really want is a consistent experience with the brand and product at all touch points.” Video-sharing platforms such as YouTube are recognized as being hugely influential in modern purchase journeys, and L'Oréal clearly recognizes this.

2.6. MCDONALD'S CANADA – OUR FOOD.YOUR QUESTIONS:

McDonald's Canada's Our Food. Your Questions “transparency” campaign is oft-cited as one of the best content marketing innovations ever created. The fast food giant's site allows customers to submit questions about the food they're eating, then receive answers straight from the company. One caveat: in order to have a question answered, a person must share the question they ask on their Facebook or Twitter page. This means that both sides benefit — the company gets extra exposure by showing up on peoples' Timelines and Twitter feeds, and customers get answers to questions they've been dying to figure out. SThe Our Food, Your Questions campaign does well: visitors to the site are spending an average of about 4.5 minutes reading the answers to about 12 questions. One of the campaign's promo videos, addressing why hamburgers look different in stores than they do in ads, garnered about 8 million views on YouTube in less than a year. The success of the campaign can be attributed to several factors: first, it appeals to a long-existent desire to know more about the ingredients in fast food (what *is* that pink stuff in a Chicken McNugget, anyway?), as well as our culture's newish obsession with health and nutrition. Also – it is a movement towards transparency in marketing; people don't necessarily want a sugar coated version of the truth – they value honesty and knowledge.

2.7. AMERICAN EXPRESS – OPEN FORUM:

American Express launched their OPEN Forum, and it was one of the most transformative content marketing innovations ever. The OPEN Forum (initially a resource available only to American Express cardholders) is a platform that provides resources and insights for small business holders. The company made its contents accessible to the public, and it has since become a leading online destination for executives, entrepreneurs, startup heads (and more) looking for business inspiration. The OPEN Forum paved the way for companies who decided to offer content marketing as a service – and it continues to thrive today.

2.8. BUZZFEED – TASTY VIDEOS:

You've probably seen (and drooled over) those delicious-looking recipe videos from Tasty in your Facebook feed. If you haven't seen them, they show a person's hands, from above, preparing a recipe (in fast-motion), set to catchy music. The Tasty videos are one of the genius content marketing innovations by news powerhouse (and now one of the top content marketing companies) BuzzFeed, which decided to create a video series that would draw in the same people its news stories appeal to: the masses. The recipes included in Tasty's videos are not haute-cuisines dishes; they're delicious things that you or I would want to cook for a dinner party for friends or make after work: mini oreo cheesecakes, Greek yogurt veggie dip, and slow cooker shredded chicken tacos. Tasty has been around for a little over a year; but, today, the Facebook page has about 61 million likes. The success of the Tasty videos can be attributed to many things. They make cooking seem easy and fun; they're slick and pretty; and they pick recipes that appeal to a variety of palettes. But one reason that BuzzFeed's creative content marketing approach was innovative is because they were one of the first companies to take advantage of Facebook's autoplay video platform. Tasty videos are created for the sole purpose of playing on Facebook, and they play automatically when a user scrolls over them. This helps capture the attention of

people – whether they were looking for recipe videos — or not. Also, the videos encourage virality, since they are easily shareable.

2.9. MARKETO – THE BIG MARKETING ACTIVITY COLORING BOOK:

When you think about B2B content marketing innovations, you don't think about crayons, markers and colored pencils. However, Marketo hit it big with their very own coloring book about marketing for marketers, "The Big Marketing Activity Coloring Book." The downloadable book is 30 pages long, and it is filled with pictures to color, games to play (like Mad Libs), and quizzes (like matching the marketer with the book they've written). While creating a coloring book to teach marketers about marketing might seem out of the box – this creative content marketing innovation worked. According to an article about Marketo's strategies on Contently, the book has been downloaded tens of thousands of times, and it's helped the company net about \$500,000 dollars. Marketo's marketing innovation reminds us that marketing doesn't always have to be serious or "professional." Sometimes, the best way to approach a campaign is by bringing in fun, entertainment, and lightheartedness – the stuff you liked when you were a kid.

2.10. RED BULL – STRATOS PROJECT:

Red Bull is a company that has become well known for their unique marketing innovations. One content marketing innovation that made them pioneers in the field was their Stratos Project. For the project, the company live-streamed video of skydiver Felix Baumgartner dropping from near-space (23 miles up) on YouTube. During the live stream, more than 8 million viewers tuned in – making it the YouTube video with the most concurrent views ever. Red Bull got a lot of things right when they decided to take on the Stratos Project. First, their subject matter was just plain awesome – who doesn't want to see a skydiver fall 128,000 feet to the ground faster than the speed of sound? They also appealed to the right customer base: people who are interested in adventure, endurance and pushing the limits. They also made the broadcast an event: to catch the stunt you had to tune in live, which ensured that tons of eyes were looking at the content their brand was sharing with the world. Finally, the jump got a lot of press and every report mentioned that Red Bull was behind it. This helped boost brand awareness – calling the attention of people who may not have previously known about the event or the brand.

2.11. Red Bull CHARMIN – SITORSQUAT APP:

Sometimes, you just need to make a pit stop when you're on the go – and it can be annoying when you're not sure where the closest (usable) restroom is. To solve that problem, paper goods brand Charmin (owned by Procter and Gamble) decided to team up with an existing app called SitOrSquat Restroom Finder for one of the most useful – and ingenious- content marketing innovations. SitOrSquat allows people to locate restrooms on the go. One of the best features of the creation, however, is that users of the app can rate each restroom based on its "sit-ability" (meaning, if it's clean and nice – or not) – which helps encourage user engagement, and helps people avoid gross bathrooms as often as possible. To date, there are more than 100,000 bathrooms listed on the app. Charmin's decision to sponsor an existing popular bathroom is smart and innovative because it links the brand with a relevant, helpful resource in its industry. The branded app provides something useful – not an ad or a chance to shop – helping the company be viewed as a valuable influencer and a trusted resource. (In fact, even Everyday Health's Crohns Disease Center lists the app as a helpful resource for sufferers of the disease).

2.12. WESTJET – CHRISTMAS MIRACLE: REAL-TIME GIVING VIDEO:

Canada-based airline WestJet made a huge content marketing splash when it created the Christmas Miracle: real-time giving video. The video, which debuted at the start of the holiday season, features pre-flight WestJet passengers arriving at their airline gate, telling Santa Claus (on a television screen) what they want for Christmas. It then shows WestJet employees shopping for those gifts for passengers – then delivering them to passengers via the baggage claim at their destination airport. WestJet's unique marketing video is a real tearjerker (better have a box of tissues on-hand before you watch!) It is filled the emotional, joyous reactions of passengers receiving their gifts – which is infectiously happy and uplifting. In just a few days after the company released it, it had been watched more than 13 million times on YouTube – in more than 200 countries. (Today, the video has more than 45 million views). The company got a lot of things right when it decided to create the Christmas Miracle video. First, it took advantage of the spirit of the season. The people are in a nostalgic, wistful, family-oriented mood during the season – and this piece of content played on that masterfully. Additionally, WestJet took advantage of social channels to encourage sharing. This meant that people disseminated the video on their own, cutting advertising costs for the airline. Finally, it painted the company as a generous, good-spirited, noble brand — awesome for business.

2.13. THE FURROW :

The Furrow, a magazine created by brand John Deere. 107 years ago, John Deere decided to create a brand magazine to provide helpful information to their customers and potential customers: the American farming community. The magazine was full of farming tips, anecdotal stories about using plows, and more. *The Furrow* was a huge success: by

1912 (its peak), the magazine had more than 4 million readers. Today (despite the decline in popularity of farming) it still has more than 2 million readers globally. The innovativeness behind *The Furrow* is straightforward: more than a hundred years before content marketing even became a thing, John Deere was offering published content in order to brand itself as knowledgeable and a thought-leader. The company realized they could provide more value to the world than just their products and they stepped away from traditional advertising to show that they were a brand with a lot to offer.

3. FINAL THOUGHTS:

Judging by the above examples, it's clear that innovation is an incredibly valuable commodity for digital-era brands. All of the brands explored above display a clear focus on customer-centric experiences; innovative marketing practices enable them to design and provide for consumers in ways that enhance those experiences, in ways consumers may not yet even expect. Ultimately, innovation is crucial for great marketing because there will always be room to improve brand relationship and experience with consumers. Ensuring that innovative practices are able to exert their influence on a brand's marketing efforts, allows brands to be consumer-centric. This is the age of love blogs, e-books, white papers, a moving video, an interactive piece that blows one away with stunning visuals, or a game that keeps one entertained for hours. These content marketing creations are inspiring, and often, if they're done really well, they have an impact not only on each person who encounters them – but also the industry at large. These awesome brands have been able to change the landscape of content marketing by doing things differently; their unique marketing tactics not only boosted business for a company, but also inspired, entertained, improved and transformed. Ultimately, content marketing is about sharing valuable knowledge with the world via publishing platforms in order to prove that you are a knowledgeable, trustworthy with content since people know just how important it is. That's why content marketing innovations are key – they help top content marketing companies stand out in the vast sea of content that is the Internet – making sure your business gets noticed and seen for the forward thinking organization it is.

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**‘Sanjyot-2018’ National Seminar on
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A Study of Labor Absenteeism in Selected Industrial Units in Ahmednagar District (M.S.)

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Abstract: Labor absenteeism is one of the major and serious problem of industry. Now a days most of the industries faced problems towards labor absenteeism. Labor absenteeism impact on performance of the organisation to reduce productivity. Communication and willing to work together is the way to achieve a common goals and objectives of the organization to avoid absenteeism in workplace. This research study deals with the study of labor absenteeism in selected industrial units Ahmednagar. The study includes reason behind absenteeism and problems of labor in organisation. Research includes fifty sample sizes, data is collected from selected industrial units in Ahmednagar district and collected data is analysed with the help of Statistical and mathematical tools and interpret it.

Key Words: Absenteeism, Performance, Productivity etc.

1. INTRODUCTION:

Labor absenteeism is one of the difficult problems which management faces seriously. Absenteeism is costly for both employees and employers. The employee may not be paid for taking excessive time off or may even lose their job for calling in sick or for other absences. Absenteeism is a habitual pattern of absence from a duty or obligation without good reason. Generally, absenteeism is unplanned absences. Absenteeism has been viewed as an indicator of poor individual performance, as well as a breach of an implicit contract between employee and employer. It is seen as a management problem, and framed in economic or quasi-economic terms. More recent scholarship seeks to understand absenteeism as an indicator of psychological, medical, or social adjustment to work. Absent employees impact an organization's productivity, revenue, and costs. Absenteeism contributes to employee turnover, increased labor costs when replacement workers need to be hired, and to other management and hiring costs. Proof of your leave (a jury duty notice, a doctor's note, an obituary, etc.) is usually sufficient documentation for an employer to excuse absenteeism. However, employers can spot trends and may keep track of how often an employee is absent and what their reasons are.

2. PURPOSE OF THE STUDY:

As Labor absenteeism is major problem faced by industry and several impacts on productivity. This research helps to study how to reduce the labor absenteeism and increase the productivity as well as efficiency of the organization.

3. REVIEW OF LITERATURE:

- **Rice (1985)** emphasized the relationship between work satisfaction and Quality of people's lives. The study contended that work experiences and outcomes can affect person's general Quality of life, both directly and indirectly which effects on their family interactions, leisure activities and levels of health and energy.
- **Galinsky et al (1991)** discussed on work life balance policies which are The values, which attract prospective employees and are tools for employee retention and motivation. The study found that one should also keep in mind that new generation employees evaluate their career progress not only in

terms of lucrative job assignments but also in terms of their ability to maintain healthy balance between their work and non-work life.

- **Chaykowski& Powell (1999)** explored on Part-time employment for women, where part-time employment offers fewer benefits and little prospects for an occupational pension in lieu of flexibility but part-time employment helps in caring for children, managing personal responsibilities.
- **Moenand Yu (2000)** expresses that majority of men and women (without any gender differences) admit that they are not able to spend enough time with their family. Also both the genders observed that the boundary between work and leisure is blurred.

3.1. RESEARCH OBJECTIVES:

- To find out the reasons of the absenteeism.
- To find out the problems of labor.

3.2. SIGNIFICANCE OF THE STUDY:

- Reduce cost of absenteeism
- Provide safety valve to express the dissatisfaction of workers.
- Improve quality of work life.
- Guide employees to solve their personal problems.
- Training & developing programmed.

3.3. SCOPE AND LIMITATIONS OF THE STUDY:

- Respondents are limited only to selected industrial units in Ahmednagar district.
- This study is confined only to absenteeism of labor.
- Lack of time duration again acts as a hurdle for collecting more information.
- Workers do not give accurate information about their working condition, habits such as smoking and drinking habits, coring and memos received by them etc.

4. RESERCH METHODOLOGY:

4.1. **Type of Data:** - Primary Data, Secondary Data

4.2.Sources of Data:

Present study is based on both primary and secondary data. The data for the research will be collect from the following sources.

- **Primary Source Data:**

The primary data is collected from the labors in selected industrial units in Ahmednagar district with help of structured questionnaire

- **Secondary Source Data:**

Secondary data will collect from annual reports, books, journals, magazines, newspapers. Web portals, internet sites etc.

5. Method of Data Collection:Survey Method

5.1. Research Instrument:

A 'Structured Questionnaire' is used as a research instrument to collect the primary data.

- **Sampling Methods:** Stratified Random Sampling Method.
- **Sample Size:** 50 respondents from selected industrial units in Ahmednagar district.

Picture of Sample Size is given below:

Sr.No.	Selected Industrial Units	No.of Respondents
1	CromptonGreves Ltd. Ahmednagar	20
2	Suyash Metal Pressing Pvt. Ltd. Ahmednagar	15
3	Hoganas India Pvt. Ltd. Ahmednagar	15
	Total	50

6. Tools for Data Analysis:

6.1 Presentation of data:

Tabular and graphical method is used for presentation of primary data. Pie chart, vertical Bar chart is used for the graphical presentation of the data.

6.2 Statistical Tool: Statistical. Mathematical Weighted average used for the analysis.

Hypothesis:

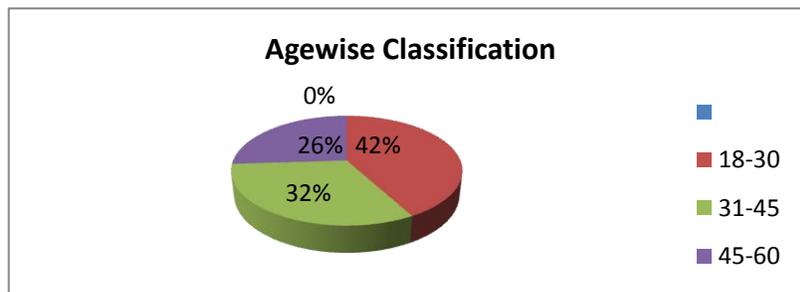
Ha1: Labor absenteeism creates problems in routine work at industry.

Ha2: Labor absenteeism reduces the efficiency of the production.

7. DATA ANALYSIS AND INTERPRETATION:

7.1. Age-group wise classification

Sr. No.	Age	No. of Respondents	Percentage
1	18-30	21	42
2	31-45	16	32
3	45-60	13	26

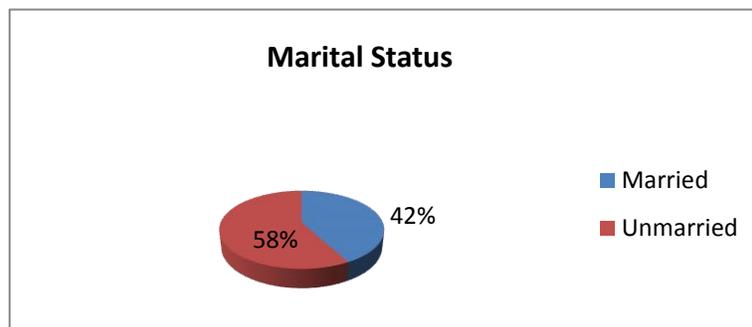


• Interpretation:

It is found that, 42% of the labor in 18-30 years age group, 32% of the labors in 31-45years age group and 26% of the labor in 45-60 age group.

7.2. Marital Status :

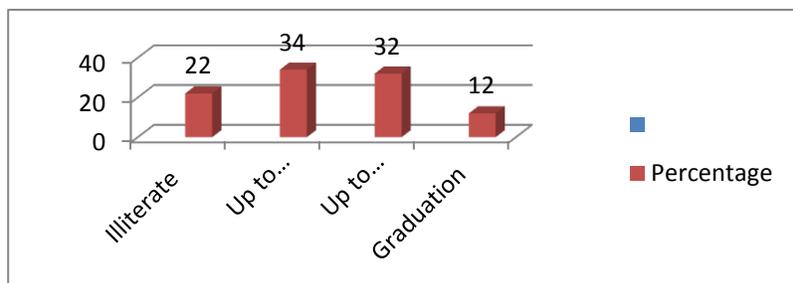
Sr.No.	Marital Status	No. of Respondents	Percentage
1	Married	21	42
2	Unmarried	29	58



• Interpretation: It is found that, 58% of labor is married and 42% of the labor is unmarried.

7.3. Education background :

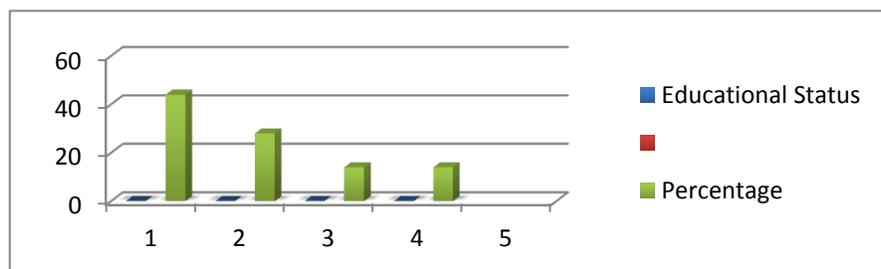
Sr.No.	Educational Status	No. of Respondents	Percentage
1	Illiterate	11	22
2	Up to 10 th Class	17	34
3	Up to 12 th Class	16	32
4	Graduation	06	12



- **Interpretation:** It is found that, 34% of the labor is educated up to 10th class, 32% of the labor is educated up to 12th class, 22% of the labor is illiterate and 12% labor is graduated.

7.4. Work experience:

Sr.No.	Work Experience	No. of Respondents	Percentage
1	Less than 5 years	22	44
2	5 to 15 years	14	28
3	15 to 25 years	07	14
4	More than 25 years	07	14

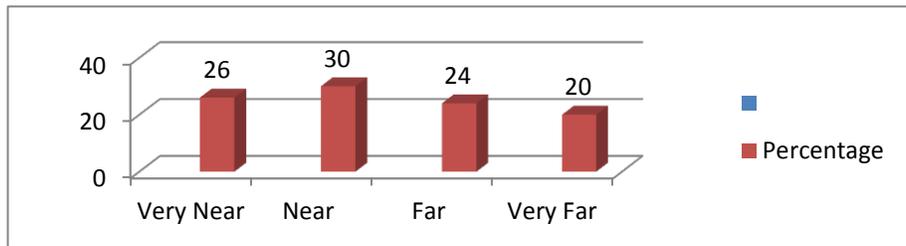


- **Interpretation:** It is found that, 44% of the labor having less than 5 years' experience, 28% of the labor having 5-10 years' experience, 14% of the labor having 15-25 years experience and 14% of the labor having more than 25 years' experience.

7.5. Distance of work place from residence:

Sr.No.	Educational Status	No. of Respondents	Percentage
1	Very Near	13	26
2	Near	15	30

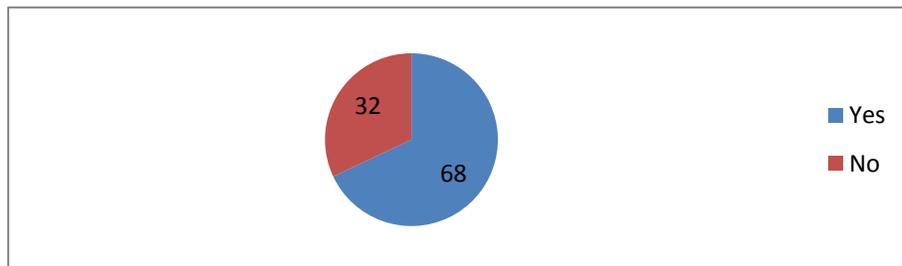
3	Far	12	24
4	Very Far	10	20



- Interpretation:** It is found that, 30% of the labor near the residence, 26% of the labor very near the work place distance from residence, 24% of the labor far is work place from the residence and 20% of the labor very far the distance from residence.

7.6. Stressed while at work :

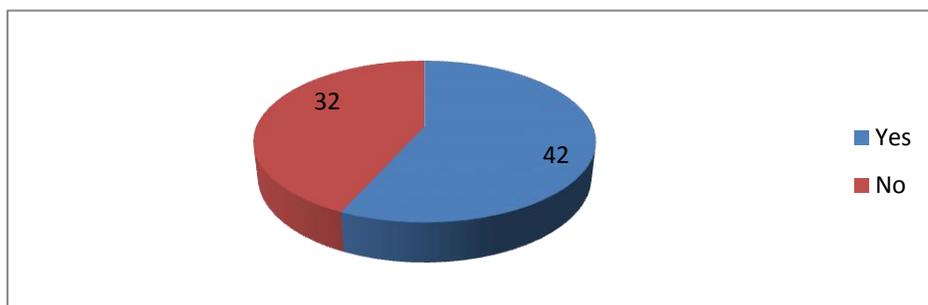
Sr.No.	Particulars	No. of Respondents	Percentage
1	Yes	34	68
2	No	16	32



- Interpretation:** It is found that, 68% of the labor stressed while at work and 32% of the labor doesn't stress awhile at work.

7.7 Are you habitual to gambling or consumption of alcohol :

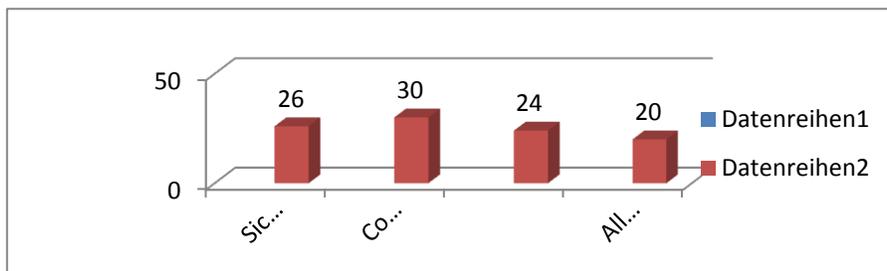
Sr.No.	Particular	No. of Respondents	Percentage
1	Yes	21	42
2	No	29	58



- Interpretation:** It is found that, 58% of the labor does not habitual to gambling or consumption of alcohol and 42% of the labor habitual to gambling or consumption of alcohol.

7.7. Type of leave do you avail often :

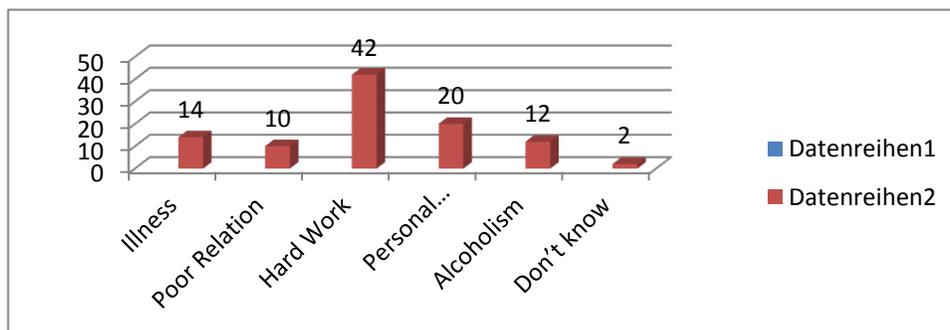
Sr.No.	Particular	No. of Respondents	Percentage
1	Sick Leave	13	26
2	Commercial Leave	15	30
3	Privilege Leave	12	24
4	All above	10	20



- Interpretation:** It is found that, 30% of the labor avail often sick leave, 30% of the labor avail often commercial leave, 24% of the labor avail often privilege leave and 20% of the labor avail often all combined leave.

7.8. Causes of absenteeism in your view

Sr.No.	Particular	No. of Respondents	Percentage
1	Illness	07	14
2	Poor Relation	05	10
3	Hard Work	21	42
4	Personal Reason	10	20
5	Alcoholism	06	12
6	Don't know	01	02



- Interpretation:** It is found that, 42% of the labor view that cause of the absenteeism due to hardwork, 20% of the labor view that, cause of the absenteeism due to personal reason, 14% of the labor view that, cause of the absenteeism due to illness, 12% of the labor view that, cause of the absenteeism due to alcoholism, 10% of the labor view that, cause of the absenteeism due to poor relation and 2% of the labor unknown about absenteeism.

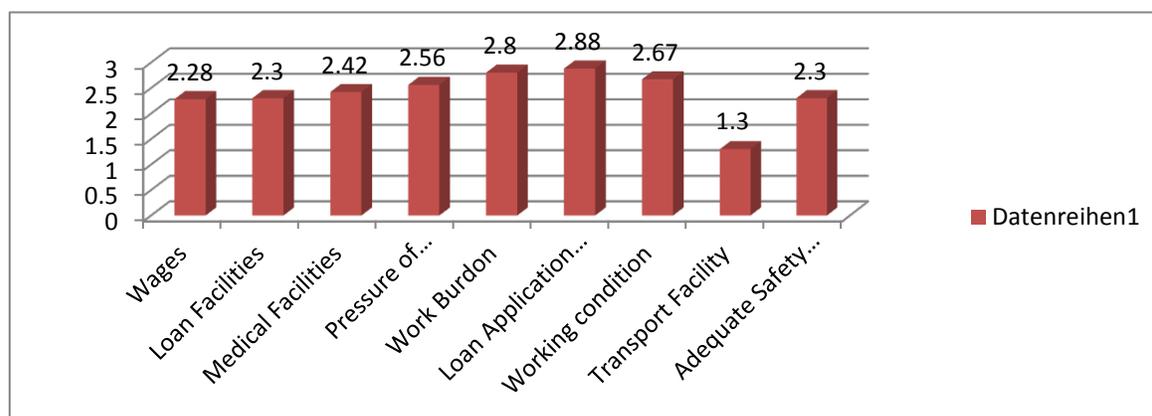
7.9. Rate the following Satisfaction scale 5 Point Scale (5Extremely Satisfied, 4 Satisfied 3 Neutral, 2 Dissatisfied, 1 Extremely Dissatisfied)

Sr. No.	Particulars	Satisfaction Scale					Weighted Avg.
		Extremely Satisfied (5)	Satisfied (4)	Neutral (3)	Dissatisfied (2)	Extremely Dissatisfied (1)	

1	Wages	04	06	03	24	13	2.28
2	Loan Facilities	06	06	02	19	17	2.3
3	Medical Facilities	02	08	09	21	10	2.42
4	Pressure of Supervisor	04	08	13	12	13	2.56
5	Work Burdon	05	09	11	21	04	2.8
6	Loan Application Process time	03	21	02	13	13	2.88
7	Working condition	10	10	04	14	12	2.67
8	Transport Facility	-	-	-	15	35	1.3
9	Adequate Safety Measures	-	12	04	21	13	2.3

Weighted Avg. = E (Freq.X Weight)

Total Frequency



8. FINDINGS:

- Table I ,II , III and IV shows that, demographical representation of the population. Includes,age,marital status and education etc.
- Table V shows that, most of the labor residence is nearby workplace.
- Table VI shows that,Most of the labor stressed while at work.
- Table VII shows that,few of the labor habitual to gambling or consumption of alcohol.
- Table VIII AND VIII shows that, leave avail and of the labor views the cause of the absenteeism due to hard work at workplace.
- Table X shows that, Labor are dissatisfied about wages,loanfacilities,Overburdon.
- Labors dissatisfied about working conditions transport facilities and adequate safety measures at workplace.

9. SUGGESTIONS:

- Organized meditation and health check-up programmes regularly for labor to reduce the stress while at work.
- To create interest in workplace.
- Provides sound working condition at workplace.
- Provides timely wages and loan facilities.
- Provides transportation facilities
- Provides safety equipment's like helmet,goggles, shoes and hand gloves to avoid industrial accidents.
- Reduce the overburden of work.

10. CONCLUSIONS:

It can be concluded that,day by day absenteeism of labor is increased due to lot of reasons mainly, working condition,overburden,inadequate facilities like loan, inadequate safety equipment's,irregular payments,transportation

facilities etc. Labor faced stress while at working. According to research study the alternate hypothesis Ha1: Labor absenteeism creates problems in routine work at industry and Ha2 Labor absenteeism reduces the efficiency of the production both formulated hypothesis is accepted. To avoidance of the labour absenteeism problem at work place to create interest in work, provides monetary and non-monetary benefits to labor and involving in decision making process at operative level. Reducing the absenteeism of labor is one of the challenge to organization. Adopting ethical and best management practices helps to achieving the goals and objectives of the organization.

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02nd & 03rd February, 2018 at Sanjivani College of Engineering,
Kopergaon, Dist- Ahmednagar, Maharashtra, India,**

Human Resource Development Practices and Organizational Innovation: Role of Knowledge Management Effectiveness

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Abstract: Organizational innovation has been viewed as an essential weapon for organizations to compete in this competitive business environment. Particularly, in Karnataka manufacturing firms strive to transform their business model from labor-intensive to knowledge-intensive, which lead to higher value added activities such as, developing new products, processes, and services, to continual sustain the competitive world. One of the ways to heighten the organizational innovation is through effective human resource management (HRD) practices and effective knowledge management. This study examined the direct relationships between HRD practices (performance appraisal, career management, training, reward system, and recruitment) and organizational innovation (product innovation, process innovation, and administrative innovation). Additionally, it also examined the mediating role of KM effectiveness on the direct relationship. The study show that HRD practices generally have a positive effect on organizational innovation. Specifically, the findings indicate that training was positively related to three dimensions of organizational innovation (product innovation, process innovation, and administrative innovation). Performance appraisal also found to have a positive effect on administrative innovation. Study also demonstrates that training and performance appraisal, are positively related to knowledge management effectiveness. Knowledge management effectiveness fully mediates the relationship between training and process innovation, training and administrative innovation, and performance appraisal and administrative innovation.

Key Words: Knowledge worker, Organizational learning, HRD practice, Product innovation, Process

1. INTRODUCTION:

Albert Einstein famously said that “we cannot solve the problem with the same thinking we used when we created them”. Organizations who see & act upon the opportunities and possibilities for change through innovation in the current volatile and uncertain, business environment will not only survive; they will successfully compete and even flourish in the face of the range of emerging adverse and fluctuating business and economic conditions. The rapid development of high technology, information and communications technologies have urged many organizations to actively seek for new way, ideas, experimentation, and creative solutions in improving their current product, process, system and technology, which commonly referred as organizational innovation. its new economy model which aims in transforming the manufacturing firms from the product based towards the knowledge based. Aligned with this move, understanding the fundamental drivers influencing an organization’s ability to innovate successful new products, idea, practices and system is a key strategic task for firms to continue to exist in this dynamic market. It has been widely acknowledged that effective human management resource (HRM) practices (Damampour & Gopalakrishnan, 1998; Tan & Nasurdin, 2010) are significant in extracting positive work behaviours among employees, which consecutively lead to organizational innovation. According to Harter, Schmidt, and Hayes (2002), HRM practices can generate increased knowledge, motivation, synergy, and commitment of a firm’s employees, resulting in a source of sustained competitive advantage for the firm. However, a number of authors, such as

Hilsop (2003), Morrow and McElroy (2001), and Moynihan, Gardner, Park, and Wright (2001) have argued on the missing link between HRM practices and organization outcomes. The author argued the more research needs to concentrate on the indirect relationship between HRM practices and organizational innovation. Since knowledge is reside in an individual and given the role of HRM practices in influencing an individual's attitude and behaviours, it is believed that HRM practices has significant and positive relationship on organizational innovation via knowledge management. Kimberly & Evanisko, 1981), environmental factors (Damanpour, Szabat, & Evan. 1989; Miller & Friesen, 1982), and organizational structure (Damanpour, 1991; Thompson, 1965). However, there is still unexplored research area about particular organizational practices that may influence the organizational innovation. According to Tan and Nasurdin (2010), an organization's approach of HRM practices has an influential effect on organizational innovation. HRD practices set the tone and condition of the employer-employee relationship which can encourage the employees to become more innovative (Rousseau & Greller, 1994). If HRD practices properly realigned, it can play a vital role in contributing to the management of organizational knowledge, and innovation will be realized through the ability to use the knowledge to identify and pursue the opportunity. This postulates that knowledge management effectiveness allowing employees to generate knowledge within their sphere of influence, and extent as of shared knowledge influences the organizational innovation (Dobni, 2006). Against this backdrop, the goal of this study was to examine the role of knowledge management effectiveness mediating the relationship between HRD practices (performance appraisal, career management, training, reward system, recruitment) and organizational innovation (product innovation, process innovation and administrative innovation)

2. ORGANIZATIONAL INNOVATION:

Organizational innovation has been widely defined as the creation of new idea and new behaviour to the organization (Damanpour & Gopalakrishnan, 2001). The dimensions of organizational innovation are extremely complex and multiple; it can be reviewed from two aspects: (1) breadth of innovation, which includes policies, system, administrative, processes, products, services, and others; (2) depth of innovation, which includes the importance, the degree of influence, effect on long term profitability, and others (Chuang, 2005). Fundamentally, there are two distinctive types of organizational innovation have been classified in most literature, namely technological innovation, and administrative innovation (i.e. Chuang, 2005; Damanpour & Evan, 1984; Damanpour et al., 1989; Tan & Nasurdin, 2010). Chuang (2005) has further categorized technological innovation into secondary dimensions: product innovation and process innovation; while administrative innovation remains distinct from the other two. Under Mavondo, Chimhanzi and Stewart's (2003) study, organizational innovation was distinctively classified into three dimensions, namely: product innovation, process innovation and administrative innovation. The present study divided organizational innovation into the main dimensions of product innovation, process innovation and administrative innovation based on the most prevalent types that have been discussed in the previous literatures (i.e. Chuang, 2005; Damanpour, 1991; Damanpour & Evan, 1984; Damanpour et al., 1989; Mavondo et al., 2003; Tan & Nasurdin, 2010). Product innovation, process innovation and administrative innovation are the important predecessors for manufacturing firms and have the equal capability to improve performance or effectiveness, solve problems, add value, and create competitive advantage (Cooper, 1998; Damanpour, 1996). Given the importance of product innovation, process innovation and administrative innovation in enhancing manufacturing firm performance, therefore, the organizational innovation is operationalized to be multidimensional comprising of these three types of organizational innovation. Product innovation is defined as the development and commercialization of new product to create value and meet the needs of the external user or the needs of the market (Damanpour & Gopalakrishnan, 2001). Product innovation is a systematic work process which drawing upon existing knowledge gained from research and practical experiences directed towards the production of new materials, products and devices, including prototypes. On the other hand, process innovation is viewed as a creation of new process or improvement to existing processes (Leonard & Waldman, 2007). Process innovation involves the implementation of a new significantly improved production or delivery method, which includes changes in techniques, equipment and/or software (Bi, Sun, Zheng & Li, 2006). Administrative innovation is viewed as performance derived from the changes to organizational structure and administrative process, reward and information system, and it encompasses basic work activities within the organization which is directly related to management (Chew, 2000; Damanpour & Evan, 1984). Administrative innovation requires organizations to have verifiable routines and procedures in place for product design, manufacture, delivery, service and support (Brunsson, Jacobsson, Ahrne, Furnsten, Garsten, Hennin, Sahlin-Andersson & Hallström, 2000). Since manufacturing firms operate in the highly complex environment on the basis of internal operations efficiency and effectiveness, product innovation, process innovation and administrative innovation can be considered as the pivotal sources of competitive advantage.

3. KNOWLEDGE MANAGEMENT (KM)

Knowledge management (KM) is a process that helps organizations find, select, organize, disseminate, and transfer important information and expertise necessary for activities such as problem solving, dynamic learning, strategic planning and decision making. To improve the effectiveness of knowledgeable experts, information systems groups at several organizations have started creating databases for knowledge, information maps and custom-made applications. Early in the industrial era, organizations improved their efficiency, effectiveness and hence, their competitive edge by automating manual labor and reducing redundancy. However, now, in the age of the knowledge worker, many organizations have gone through massive restructuring to eliminate redundant workers and jobs. This movement has been swept up by business process re-engineering that resulted in leaner organizations. However, organizations are facing increasingly global competition and a more sophisticated consumer. To stay competitive, companies must still be innovative in reducing their costs and expanding their markets. Thus, organizations are streamlining their processes. KM enters the picture at this point. Organizations are beginning to realize that there is a vast and largely untapped asset diffused around in the organization - knowledge. KM emerged with not only the need to be cost-efficient and managerially effective in problem solving, decision making, innovation and all other elements needed to maintain and develop a competitive edge, but also more specifically, to capture, catalogue, preserve, disseminate the expertise and knowledge that are part of organizational memory that typically resides within the organization in an unstructured way.

4. HUMAN RESOURCE MANAGEMENT (HRD) PRACTICES:

As the world is becoming more competitive and unstable than ever before, manufacturing-based industries are seeking to gain competitive advantage at all cost and are turning to more innovative sources through Vidya A. Salokhe (2002) conducted a study on HRD, observes that "Human Resource Development (HRD)" signifies an effort aimed at qualitative improvement of human beings in their specific role as assets of an organization. HRM practices have been defined in several aspects. Schuler and Jackson (1987) defined HRM practices as a system that attracts, develops, motivates, and retains employees to ensure the effective implementation and the survival of the organization and its members. Besides, HRM practices is also conceptualized as a set of internally consistent policies and practices designed and implemented to ensure that a firm's human capital contribute to the achievement of its business objectives (Delery & Doty, 1996). Som (2008) studied the role of innovative HRM practices and their impact on enhanced corporate performance during the change process. The results found that innovative recruitment and compensation practices have positive significant relationship with firm performance. Likewise, Minbaeva (2005) viewed HRM practices a set of practices used by organization to manage human resources through facilitating the development of competencies that are firm specific, produce complex social relation and generate organization knowledge to sustain competitive advantage. Against this backdrop, we concluded that HRM practices relate to specific practices, formal policies, and philosophies that are designed to attract, develop, motivate, and retain employees who ensure the effective functioning and survival of the organization. Among the main approaches to develop HRM: —universall or —best practice approach (Huselid, 1995); strategic HRM practices approach (Delery & Doty, 1996); contingency approach (Dyer, 1985; Schuler, 1989); and configuration approach (Wright & McMahan, 1992), previous studies revealed that HRM practices, which were related to organizational innovation, mainly focused on —universall or —best practice approach. A review of the literature demonstrates five common practices that have been consistently associated with innovation, encompassing performance appraisal, career management, reward system, training, and recruitment (Gupta & Singhal, 1993; Jiménez-Jiménez & Sanz-Valle, 2005; Kydd & Oppenheim, 1990; Laursen & Foss, 2003; Shipton, Fay, West, Patterson & Birdi, 2005).

5. KNOWLEDGE MANAGEMENT EFFECTIVENESS:

The learning process occurred to improve the stock of knowledge available to the organization and to amplify the value of its intellectual assets, such as innovation capital when knowledge is acquired and applied. If an organization demonstrates competence in knowledge management, it can be considered as having a knowledge management-orientation (Darroch & McNaughton, 2002). Knowledge management has been broadly defined from many perspectives. Wiid (1997) viewed as a set of activities that lead an organization in acquiring knowledge both internally and externally. According to Salisbury (2003), knowledge management is defined as the deployment of a comprehensive system that enhances the growth of an organization's knowledge. In an effort to expand the knowledge management discipline, knowledge management can be defined as the management functions that encompass the creation of knowledge, management of the flow of knowledge within the organization, and usage of knowledge in an effective and efficient manner for the long-term benefit of the organization (Darroch & McNaughton, 2001). Hence, knowledge management effectiveness is regarded as a management discipline which focused on the development and usage of knowledge to support the achievement of strategic business objectives. Knowledge management effectiveness can be analyzed from a

process perspective (Gold, Malhotra & Segars, 2001; Zheng, 2005). In general, knowledge management effectiveness can be conceived as the effectiveness of an organization in managing the knowledge acquired, shared, and applied by its employees. In summary, knowledge management effectiveness is conceived as a process to enhance knowledge application to achieve organizational innovation for improving business performance. Organizations that effectively manage their knowledge within organization will have higher organization innovation in turn to achieve breakthrough competitive advantage.

6. HUMAN RESOURCE MANAGEMENT (HRM) PRACTICES AND ORGANIZATIONAL INNOVATION (OI)

Resource-based view (RBV) and Ability, Motivation and Opportunity (AMO) theory appear to be the most popular theories applied in the studies that link HRM and performance (Paauwe & Boselie, 2005). RBV argues that human resource is one of the organization's resources, a subset of which enable them to achieve a competitive advantage, and a subset of those that lead to superior long-term performance (Barney, 1986; 1991). The AMO theory illustrates that when employees are motivated, they are likely to perform better, leading to higher firm performance (Paauwe & Boselie, 2005). HRM practices play an influential role in motivating employees to exhibit favorable attitudes and behaviors, which are required to support and implement the competitive strategy of an organization (Hiltrop, 1996). According to Wang (2005), innovative firms treat HRM practices as the organization's strategy to encourage team responsibilities, enhance organizational culture, and build up customer relationships through participation and empowerment. In turn, it will help to create and market new products and services (Gupta & Singhal, 1993). When firms develop and introduce new product, new process and/or new administrative practices, they require innovative and creative employees, who are flexible, risk taking, and tolerant of uncertainty and ambiguity (Chen & Huang, 2007). These employees are highly recognized in manufacturing industries as they contribute to firm on the basis of market responsiveness, product and process innovation. Therefore, it is important for a firm to implement supportive HRM practices that can motivate and stimulate employees to be innovative. On the basis of arguments put forth by previous scholars (i.e. Gupta & Singhal, 1993; Jiménez-Jiménez & Sanz-Valle, 2005; Kydd & Oppenheim, 1990; Laursen & Foss 2003; Shipton et al., 2005), we would expect HRM practices to be positively related to organizational innovation. For instance, performance appraisal increase employee commitment and satisfaction since employees are given chance to discuss about their work performance. This, in turn, will lead them to perform greater in innovative activities. In a similar vein, career management assist employees to attain their career goals and objectives. If employees are likely to feel satisfied with their career management, which in turn, lead to motivate them to perform in innovative activities (Delery & Doty, 1996). Training helps employee master knowledge, skill, and ability which would be contribute to innovation in terms of products, production processes, and management practices in daily operation (Schuler & Jackson, 1987). Hence, training develops the knowledge, skill, and ability of employees to perform effectively in their job that will lead to higher organizational innovation. Reward system provides financial reward, promotion and other recognition, in order to motivate employees to take risk, develop successful new products and generate newer ideas (Guptal & Singhal, 1993). Reward system encourages employee to become motivated, thereby increase their participation in contributing innovation ideas, which leading to high organizational innovation. Recruitment involves employing and obtaining appropriate and competent candidates through external sourcing (Sparrow, Schuler & Jackson, 1994). Recruitment gives greater importance to be attached to fit between person and company culture. Hence, the high level of implementation of recruitment that attaches individual – organizational fit is likely to result in high organizational innovation. Drawing upon the argument given above, thus, our main hypotheses are constructed as follows:

- H: The level of HRD practices (performance appraisal, career management, training, reward system, and recruitment) will be positively related to the organizational innovation (product innovation, process innovation and administrative innovation).
- H: The level of HRD practices (performance appraisal, career management, training, reward system, and recruitment) will be positively related to the product innovation.
- H: The level of HRD practices (performance appraisal, career management, training, reward system, and recruitment) will be positively related to the process innovation.
- H: The level of HRD practices (performance appraisal, career management, training, reward system, and recruitment) will be positively related to the administrative innovation.

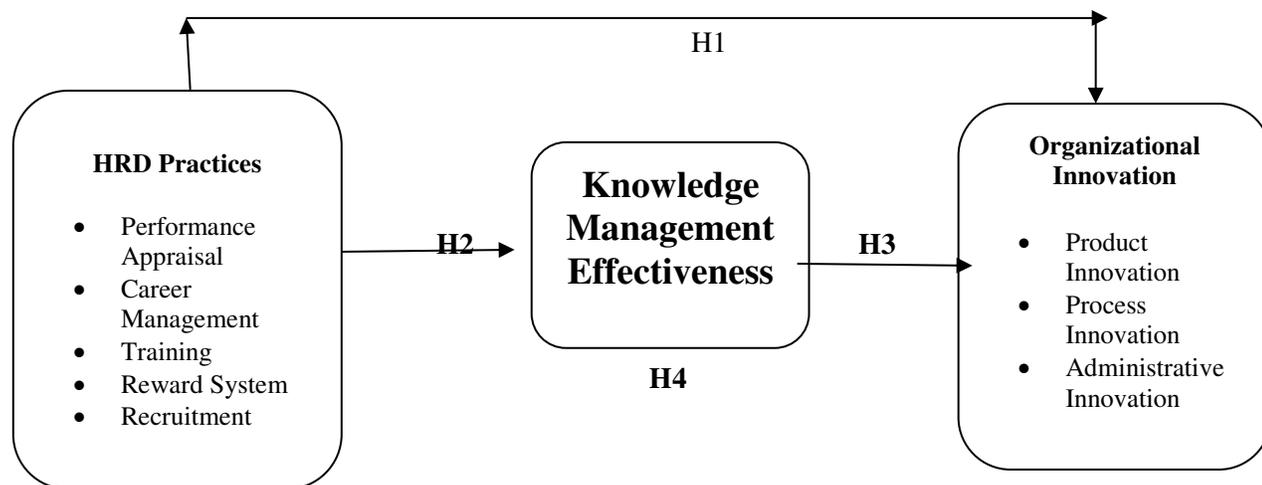
7. KNOWLEDGE MANAGEMENT EFFECTIVENESS AS A MEDIATOR:

A number of scholars, such as Hilsop (2003), Morrow and McElroy (2001), and Moynihan et al. (2001) have argued on the missing link between HRD practices and organization outcomes. The missing link between HRM practices and organization outcomes illustrate the existence of a —black box|. The —black box| model indicated that there is an

unknown apparatus which is apparently invisible in increasing organizational innovation (Marinova & Phillimore, 2003). Knowledge management is recognized as the fundamental activity for obtaining, growing and sustaining intellectual capital in organizations (Marr & Schiuma, 2001). Knowledge management is not only served as predecessor to organizational innovation, but also an intervening mechanism between organizational factors and organizational outcomes. Previous studies have examined the role of knowledge management as a mediator. For instance, Tung's (2004) study evidenced that knowledge management mediates the relationship between an organization's culture and structure, and organizational effectiveness. Rashid Alshekaili's (2011) study reveals that knowledge management mediates the relationship between human capital and innovation performance. Since HRM practices are assumed to be a managerial process that allows firms to manage effectively so as to improve the organizational innovation, it is important to view knowledge management effectiveness as the —black boxl underlying the relationship between HRM practices and organizational innovation, which has been omitted in previous studies (i.e. Laursen & Foss, 2003; Shipton et al., 2005). Thus, this study sought to examine the indirect relationship between HRM practices and organizational innovation via knowledge management effectiveness. Therefore, we hypothesized that:

- H: Knowledge management effectiveness mediates the relationship between HRM practices (performance appraisal, career management, training, reward system, and recruitment) and organizational innovation (product innovation, process innovation and administrative innovation).
- H: Knowledge management effectiveness mediates the relationship between HRM practices (performance appraisal, career management, training, reward system, and recruitment) and product innovation.
- H: Knowledge management effectiveness mediates the relationship between HRM practices (performance appraisal, career management, training, reward system, and recruitment) and process innovation.
- H: Knowledge management effectiveness mediates the relationship between HRM practices (performance appraisal, career management, training, reward system, and recruitment) and administrative innovation.

Based on our discussion of the literature, our research framework is shown in Figure 1.



8. RESULTS:

After this study, many organization argued that there is absolutely link between HRD policies followed in the organization have complete impact on profitability, growth, overall development of employees and growth of business. Hemant Rao (2007) emphasized the changing role of HR plays important role in business. Many HR development are extremely **argued** that any value added to an employee is value added to the organization, and employees are eager for the opportunities to develop their skills and add value to their companies

9. DISCUSSION AND CONCLUSION:

The objective of the current study was to examine the direct relationship between HRD practices and organizational innovation, as well as indirect relationship between HRD practices and organizational innovation via knowledge management effectiveness. And also, the knowledge management effectiveness has a mediation effect on relationship between HRD practices and organizational innovation. Only one of five HRD practices, namely training was found to have both direct and indirect effect on all three dimensions of organizational innovation (product innovation,

process innovation, and administrative innovation). This result entailed that when organizations have higher implementation level of training, it will advance the growth of employees' requisite skills and their potential to learn. Employees are able to generate new understandings and new ideas that will be useful for organizational innovation. As a result, efforts taken to enhance knowledge management effectiveness in the manufacturing firms will be useful in enhancing the organizational innovation performance. The results of this study also offer several suggestions to manufacturing firms in Belagavi to focus on training program. Employees undertake the training programs are expected to apply the knowledge acquired on the task and job assigned. In another word, the higher level of implementation of training, the more transfer and flow of information and knowledge which will increase organizational learning and instill new ideas, leading to product innovation, process innovation and administrative innovation. Performance appraisal, on the other hand, was found to have both direct and indirect effect on administrative innovation, but not on product innovation and process innovation. One of the possible explanations may be due to administrative innovation is usually done within a shorter period of time since administrative processes and systems can be adjusted according to the needs of the organization. Hence, feedback obtained from performance appraisal activities, usually conducted at least once annually can help organization further improve administrative processes. On the other hand, product innovation and process innovation take a longer period of time, may be several years to yield results due to technical constraints faced during product and process actualization. Hence, the feedback from performance appraisal activities may not have any impact on product innovation and process innovation. This means the higher level of implementation of fair performance appraisal, the higher level of employees' motivation towards their tasks. High motivation will help to increase employees' willingness to generate new ideas in order to increase administrative innovation. This study encounters several limitations. First, our data was cross-sectional which constrains our ability to make causal inferences. In particular, certain HRD practices such as career management, reward system, recruitment may not have immediate effect. Hence, a more appropriate method would be to conduct a longitudinal study. Second, this study is limited to manufacturing companies located in certain regions of Peninsular Belagavi. The findings obtained may not be generalized to other samples across other regions. Future research could be duplicated with larger sample from different regions within the same industry, which would improve the generality of the findings. Third, this study was confined to manufacturing industries. Future research in this area may be expanded to other service sectors such as telecommunication, health and education, in order to generalize the results reported here.

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**‘Sanjyot-2018’ National Seminar on
Emerging Innovations and Strategic Business Practices
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Kopargaoon, Dist- Ahmednagar, Maharashtra, India,**

A Study Of Effective HRM Practices In Hospitals For Better Administration For Ahmednagar District.

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***Abstract:** The purpose of this paper is to examine the effective HRM practices in hospitals for better administration for Ahmednagar district. The primary issue of the hospitals should be to bring in proper assimilation of human resource management strategies with the hospital administration. It should foster consistent team work and create commitment to improve the efficiency of its human capital. More than operational skills today in the hospitals, more emphasis is being given to ‘soft skills’ to attend the needs and requirement of the patients at the counter.*

***Key Words:** Hospitals, Healthcare, HRM Processes & Practices, HRM*

1. INTRODUCTION:

Hospital management is more of a service providing sector and therefore emphasis must be given to hospitality and quick service. The paper applies an existing conceptual framework to explore the role of the HR function in hospitals. It identifies a significant deficit in the management of core professional staff.

1.1. THE THREE PRINCIPAL:

Within many health care systems worldwide, increased attention is being focused on human resources management (HRM). Specifically, human resources are one of three principle health system inputs, with the other two major inputs being physical capital and consumables. The three principal health system inputs could be classified as human resources, physical capital and consumables.

1.2. HUMAN RESOURCE FUNCTION:

Human Resources Management function includes Job Analysis, Manpower planning, Recruitment, Selection, Induction, Training and Development, Performance Appraisal, Compensation Management and Industrial Relation. The study focuses on four functions i.e. Recruitment, Selection, Induction, Training and Development, Performance Appraisal. It is observed that those hospitals following systematically and scientifically Human Resources Management practices create high satisfaction level within employees. These employees are more committed towards better performance. On the other side in some well – known hospitals, HR Dept. is seen as a mere Cost Centre that ensures the payroll is on time and Leave Record tracking is accomplished. In such hospitals employee satisfaction level is on lower curve. In era of globalization where hospital sector is booming and there is increasing demand of hospital services, all employees should be managed efficiently and effectively by implementing systematically and scientifically Human Resources Management practices. Hospitals being a service industry and human intensive, the role of HRM assumes greater importance.

2. RESEARCH METHODOLOGY :

In order to have a more global context, we examined the health care systems of the nearby known hospitals, the Alchemist (private) and the general Hospital (government). The data collection was achieved through primary sources such as the data was collected through a questionnaire where the HR officials were asked different questions regarding HR practices in their hospitals respectively. We were able to examine the main human resources issues and questions, along with the analysis of the impact of human resources on the health care system, as well as the identification of the

trends in health sector reform. These trends include efficiency, processes, procedures, performance evaluation and quality objectives as the parameters.

2.1 KEY QUESTIONS AND ISSUES PERTAINING TO HUMAN RESOURCES IN HEALTH CARE :

As Indian health care reform approaches its implementation day by day, the key aspects of the Patient Protection and Care have become well known to most employers, but there remain more than a few issues that HR executives are grappling with. When examining health care systems in a global context, many general human resources issues and questions arise. Some of the issues of greatest relevance that will be discussed in further detail include the size, composition and distribution of the health care workforce, workforce training issues, the migration of health workers and cultural factors. Recruitment and retention of the correct number of qualified staff is very high on the list. Everyone knows there is a big nursing shortfall, but there is a need for highly qualified individuals all around. Due to the rapid growth of the healthcare sector and its sheer size, it is a challenge to fill jobs. And despite this need, there are obvious pressures for cost containment with people accounting for the lion's share of an organization's costs. Compliance with new standards is another key issue. Keeping up with the technological change is an issue for healthcare staff. Advances in technology require continual training and career development for employees to remain effective and maintain standards of care. The variation of size, distribution and composition within a health care workforce is of great concern. For example, the number of health workers available in a hospital is a key indicator of that hospital's capacity to provide delivery and interventions. Factors to consider when determining the demand for health services in a particular hospital include cultural characteristics, socio demographic characteristics and economic factors. Workforce training is another important issue. It is essential that human resources personnel consider the composition of the health workforce in terms of both skill categories and training levels. New options for the education and in-service training of health care workers are required to ensure that the workforce is aware of and prepared to meet a particular country's present and future needs. Another issue that arises when examining global health care systems is a country's level of economic development. There is evidence of a significant positive correlation between the level of economic development in a country and its number of human resources for health. The question of providing health benefits versus managing hourly workers to less than the 30-hours-per-week eligibility threshold is a key issue.

2.2. HR MANAGEMENT AT HEALTHCARE ORGANIZATIONS DIFFERENT THAN HR AT OTHER COMPANIES :

Healthcare organizations are essentially hiring instead of firing; hence, recruitment and retention are one of the most significant issues. While all organizations have some form of universal compliance – EEO (Equal Employment Opportunity), etc. – and others have their own regulatory issues, healthcare has some unique requirements which must be met, such as JHACO, which requires compliance with quality standards to ensure that the consumers of healthcare are receiving consistent levels of safe, quality care and includes constant monitoring of performance and patient safety records. As a result of the recent emphasis placed on recruiting and retention and the recognition that people make up 50 percent or more of the resources of a healthcare institution, these institutions have a renewed focus on HR Management and the need for better technology to manage human resources. A case can be made that healthcare institutions have lagged in this area relative to other industries.

2.3. DRIVING IMPROVED HEALTH :

Employers have long been focused on improving the overall health of their workforce. Wellness and health management programs are prevalent strategies as well as favoring health plans with better coordinated-care management for high-cost patients. More employers are now willing to reward health performance through outcomes-based incentives such as offering lower premium contributions for non-tobacco users, or rewarding employees for achieving or maintaining specific health status targets such as BMI (body/mass index) or blood pressure.

3. FINDINGS :

- The processes include staffing and recruitment, under which it was observed that the Alchemist and the general hospital verifies the existence of staffing patterns for the hospital organizational structure and the levels of each post are clearly indicated and displayed in each department.
- For recruitment, posts are advertised properly in government but it was not the case with the private. Although, in private short-listing process based upon the criteria outlined in the job description is followed.
- For final selection, proper interview panel of a minimum persons interviewing the short-listed candidates is followed in the Alchemist and the general hospital.
- The performance of each member of staff is evaluated periodically with salary increments in the private hospital.

- A 24 hour coverage by staff in the private hospital is ensured by developing staff rosters or plans, shift wise work and mobilizes staff who are not on duty in the event of having to deal with a major emergency.
- All health workers are registered with health records General directorate of Human Resources i.e. a database form requiring HR ID cards issued to employees, all information about employees shared with the Government.
- An effective process for monitoring staff attendance is followed in both the sectors.
- There is a system for dealing with complaints by the public about individual health workers
- The personnel record is maintained and updated for Health records and General Directorate Human Resource central data base.

4. CONCLUSION:

It can be said that the relationship between human resources management and health care is extremely complex, particularly when examined from both the sectors' perspective. Our research and analysis have indicated that several key questions must be addressed and that human resources management can and must play an essential role in health care sector reform. Since all health care is ultimately delivered by and to people, a strong understanding of the human resources management issues is required to ensure the success of any health care program. Further human resources initiatives are required in many health care systems, and more extensive research must be conducted to bring about new human resources policies and practices that will benefit individuals around the Nation.

4.1. SUGGESTION

- If a person is working more than 30 hours per week, a bonus or an extra payment must be awarded. The defaulting hospital administration must be penalized for the same.
- Employers will have to rigorously track their employees' hours, relying on solid databases to document those hours.
- Wellness and health management programs must be prevalent strategies as well as favoring health plans with better coordinated-care management for high-cost patients.
- Employers should now willing to reward health performance through outcomes based incentives such as offering lower premium contributions for non-tobacco users, or rewarding employees for achieving or maintaining specific health status targets such as BMI (body/mass index) or blood pressure.
- Employers should determine how much they will pay toward benefits and how to allocate that money among their employees(Private exchange case).
- Organizations should implement talent management and workforce planning solutions.
- Better performance management practices will enable them to identify, develop and retain not just all employees, but the right ones.
- A focus on quality of life initiatives.

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A Study On Nap Timing At Workplace & It's Effect On Workers

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1. INTRODUCTION:

Sleeping on the job was once considered taboo, but today, more and more companies are encouraging employees to take a mid-shift snooze. And it's a wise practice: 29 percent of workers report falling asleep or becoming very sleepy at work and a lack of sleep costs the United States \$63 billion each year in lost productivity. But a short twenty-minute nap can boost alertness and improve performance—both important when you're on the job. Zappos, the online shoe retailer known for fully subsidized employee health insurance, has had a nap room at their Las Vegas, Nevada, headquarters since they launched. "It was born from our focus on employee happiness and wellness," says a representative. "We know how much sleep impacts well-being." Furnished with a couch, two recliners, a beanbag chair, and more, the rooms are available 24/7, and are especially frequented by those on staff who work overnight shifts. The athletic giant Nike is said to extend its commitment to health and wellness to employee benefits; at their headquarters near Portland, Oregon, staffers enjoy quiet rooms, where they can nap or even meditate during the day. And at Google's Mountain View, California, home base, employees take advantage of campus-wide nap pods, which are futuristic-looking lounge chairs that play soothing sounds so workers can catch a quick snooze when they need one. Of course, employee well-being is just one benefit to company-sponsored napping. Another important bonus: improved employee performance. In the 1990s, NASA recognized sleep's crucial role for astronauts and experimented with short naps during their workdays. Not surprisingly, performance skyrocketed; today, the "NASA nap" is a common practice among pilots making international flights for airlines such as Continental and British Airways.

2. KEY WORDS- NAPPING, WORK CULTURE:

2.1. OBJECTIVES OF THE STUDY:

- To Study the Concept of Napping at work.
- To Know how the Napping Effects on Employees.
- To Know the Companies Who Adopting Napping in Corporate Culture.

2.2. HYPOTHESIS OF THE STUDY:

- Napping at Workplace is Beneficial to both Corporate & Employees.
- Napping plays Vital role in maintaining positive relationship among the Organization.

2.3. COMPANIES WHO ADOPTED NAP TIME CULTURE.

Some companies are even capitalizing on the trend. Metro Naps, for instance, manufactures napping chairs ("Energy Pods") that are designed specifically for office use. Since its founding in 2003, Metro Naps has sold nap pods to high-profile companies such as Google, Zappos, Cisco, and Procter & Gamble. Pods come with features such as a "privacy visor" and a built-in speaker system. Startups, take note: Each chair retails for \$13,000. Today, roughly 6 percent of employers have nap rooms onsite, a 1 percent increase from 2008. From scrappy startups to tech behemoths, here are a few companies that will encourage you to rest and recharge: Some companies are even capitalizing on the trend. Metro Naps, for instance, manufactures napping chairs ("Energy Pods") that are designed specifically for office use. Since its founding in 2003, Metro Naps has sold nap pods to high-profile companies such as Google, Zappos, Cisco, and Procter & Gamble. Pods come with features such as a "privacy visor" and a built-in speaker system. Startups, take note: Each chair

retails for \$13,000. Today, roughly 6 percent of employers have nap rooms onsite, a 1 percent increase from 2008. From scrappy startups to tech behemoths, here are a few companies that will encourage you to rest and recharge:

- **Uber:** The ride sharing company's San Francisco headquarters includes nap rooms. These were designed by interior design firm Studio O + A, under the supervision of principal Denise Cherry. "For Uber, a company known for regulatory battles, we were tasked with creating a room built for maximum efficiency--a room so built for work that no one would need to leave," says Cherry. "This included a living room space, a kitchenette, and, of course, small focus rooms that double as nap rooms."
- **Google:** The perks at Google's Mountain View, California, headquarters are aplenty: nap pods, complimentary food and drinks (including a coffee bar with a full-time barista), and shower rooms, to name a few.
- **Zappos:** Tony Hsieh, famed implementer of the Holacracy (self-government) workplace regime, is also a proponent of napping at work.
- **Capital One Labs:** A World's Coolest Offices 2014 honoree, the software company Capital One Labs has a wildly bright interior, meant to nurture the creative spirit among its San Francisco team. It also houses sleeping nooks, which are connected to the ground by way of ladders and "gabled blue" support beams.
- **Ben & Jerry's:** One of the earliest adopters of the workplace napping policy, the Burlington, Vermont-based ice cream company has had an office nap room for more than a decade. "The room itself is really part of the larger corporate culture here and the company's belief that a happy employee is a productive employee," a spokesperson told the BBC.
- **PricewaterhouseCoopers:** PricewaterhouseCoopers is another surprising adopter of nap pods. "A lot of companies are realizing that good performance needs a balance of healthy eating, resting, and focusing," says Stefan Camenzind, CEO of Evolution Design. The Swiss design firm recently wrapped up PwC's 50,000-square-foot offices in Basel. Evolution Design has also worked on projects for Google in Tel Aviv and Dublin. "Most people are told that the harder you work, the longer you work, the better it is," Camenzind adds. "That's not sustainable, and that's probably also not true. It's about smart working, and that means you need to recharge. In this context, nap rooms become more and more important."

2.4. ADVANTAGES OF NAPPING:

Naps can restore alertness, enhance Performance reduce mistake & Accidents .A study at NASA on sleepy military pilots & astronauts found that a 40 min nap improve performance by 34% & alertness by 100%. Naps can increase alertness in the period directly following the nap & may extend alertness a few hours later in the day. Scheduled napping has also been prescribed for those who are affected by narcolepsy. Napping has psychological benefits nap can pleasant. it can provide an easy way to get some relaxation.

2.5. DISADVANTAGES:-

In spite of these benefits, napping isn't always the best option for everyone. For example, some people have trouble sleeping any place other than their own bed, making a nap at the office or anywhere else unlikely. Other people simply have trouble sleeping in the daytime; it could be that certain individuals are more sensitive to the midday dip than others – those who are may feel sleepier and have an easier time napping. Here are some other negative effects:

- Naps can leave people with sleep inertia, especially when they last more than 10-20 minutes. Sleep inertia is defined as the feeling of grogginess and disorientation that can come with awakening from a deep sleep. While this state usually only lasts for a few minutes to a half-hour, it can be detrimental to those who must perform immediately after waking from a napping period. Post-nap impairment and disorientation is more severe, and can last longer, in people who are sleep deprived or nap for longer periods.
- Napping can also have a negative effect on other sleeping periods. A long nap or a nap taken too late in the day may adversely affect the length and quality of nighttime sleep. If you have trouble sleeping at night, a nap will only amplify problems.
- One study has indicated that napping is associated with increased risk of heart failure in people already at risk.

2.6. EFFECTS OF NAPPING ON WORKERS OF VARIOUS FIELD:

- Sleeping on the job may still be frowned upon as a sign of laziness, but in recent years, many progressive companies have begun to encourage employees to take mid-day naps to recharge.

- Marketing-software company, Hubspot has a nap room featuring a hammock suspended above a plush carpet and soothing cloud-covered walls to encourage its 750 employees to catch some z's at work. CMO Mike Volpe, who is known to use the nap room frequently, says a 20-minute nap is often all he needs to regain focus and re-energize to be more productive for the rest of the day.
- The nap room is seen as a way to help employees balance the demands of work and home life. A father of two young children, Volpe often finds himself chasing after the elusive full night's sleep, leaving him fighting fatigue during the workday.
- "If I have things that are particularly draining for me, like a presentation or lots of interviews, getting 20 or 30 minutes to pay back some of the sleep I lost the night before can make me so much more effective," he says
- The nap room is also often used by frequent travellers. "We do a fair amount of business in California and we have an office in Dublin so we're often coming back to the office after a red-eye," says Volpe. Rather than trying to slog through the day, which can lead to errors in judgment and a decline in productivity, HubSpot has found allowing employees to have a rest can help make the day much more productive.
- Napping has become increasingly popular in the tech industry, where developers are often required to work long hours, but where company culture hinges on creating a laid-back atmosphere in order to attract top talent and compete with companies who offer perks such as game rooms, lounges and on-site frozen yogurt stations. Google was among the first large tech companies to promote napping. The tech giant introduced energy pods -- reclining chairs that sit inside a large bubble and include built-in music producing soothing sounds and an alarm that wakes up nappers with lights and vibration.
- Offering employees a space to catch a mid-day siesta is now becoming a common amenity for companies looking to position themselves as progressive, dynamic places to work – almost as attractive as the office coffee machine, yet perhaps more beneficial. A 2008 study showed a power nap is more effective than caffeine.
- Although napping is becoming a more popular employee perk in some industries, there's still a great deal of resistance in the corporate world towards sleeping on the job, says Terry Cralle, a certified sleep expert who helps companies to implement a company culture that encourages napping.
- still surprised that people are put off by napping," she says. "We've got great research supporting the fact that naps can help corporations and employees, yet we still feel reluctant to make it an acceptable part of a healthy lifestyle and a healthy workday."
- The problem, she says, is that many employers and executives equate naps with slacking off, something Cralle says couldn't be farther from the truth. "Some large companies have workout areas or gyms on-site and yet we're turning a blind eye to sleep and it's a biological necessity," she says.

2.7. WHAT TO CONSIDER WHEN ENCOURAGING NAPPING IN YOUR WORKPLACE?

- Build a separate room. A quiet room with couches, a hammock or, if you have the funds, a sleep pod, is essential to encouraging employees to nap. HubSpot's nap room is located in a quiet part of the office and painted a calming shade of green with clouds and a soft carpet below the hammock to encourage drifting off. Cralle says while the mid-afternoon nap comes naturally to some, others need to learn how to nap. Having a space that encourages the body to shut down is key to training them to nap.
- Make napping part of company culture. Making napping a part of company culture means employees won't be sneaking shut-eye away from supervisors and co-workers, but rather sends the message that naps are encouraged as a way to help employees perform at their best. At HubSpot, the nap room is booked like a conference room. There are no rules about how often employees can use it, but Volpe says there haven't been any issues around misuse. "Anyone can book it for as short or as long and as often as they want, as long as they're meeting their performance goals," he says.
- Encourage employees to time their naps appropriately. A nap before a meeting or a major presentation could make all the difference between success or a performance flop. A NASA study showed a nap of just 26 minutes can boost productivity by as much as 34 percent and increase alertness by 54 percent.

3. CONCLUSION:

More than 85% of mammalian species are polyphasic sleepers, meaning that they sleep for short periods throughout the day. Humans are part of the minority of monophasic sleepers, meaning that our days are divided into two distinct periods, one for sleep and one for wakefulness. It is not clear that this is the natural sleep pattern of humans. Young children and elderly persons nap, for example, and napping is a very important aspect of many cultures. As a

nation, the United States appears to be becoming more and more sleep deprived. And it may be our busy lifestyle that keeps us from napping. While naps do not necessarily make up for inadequate or poor quality nighttime sleep, a short nap of 20-30 minutes can help to improve mood, alertness and performance. Nappers are in good company: Winston Churchill, John F. Kennedy, Ronald Reagan, Napoleon, Albert Einstein, Thomas Edison and George W. Bush are known to have valued an afternoon nap. Our results suggest that napping may be a beneficial intervention for individuals who may be required to remain awake for long periods of time by enhancing the ability to persevere through difficult or frustrating tasks. Hence, Stated both hypothesis are get accepted.

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E-Waste : It’s Components And Impact On Environment

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Abstract: *We create too much Electronic-waste and reuse way too little. Even when recycled, a significant amount of electronic material cannot be recovered. India is emerging as one of the world's major electronic waste generators, posing grave concerns to public health and environment alike. The main sources of electronic waste in India are the government, public and private (industrial) sectors, which account for almost 75% of total waste generation. Global consumption of electronics is increasing. Every year we create more e-waste than before. The contribution of individual households is relatively small at about 16 per cent; the rest being contributed by manufacturers. Though individual households are not large contributors to waste generated by computers, they consume large quantities of consumer durables and are, therefore, potential creators of waste. Our waste electronics are polluting drinking water and harming ecosystems around the world. It’s time to fix the problem.*

Key Words: *E-waste, Hazardous components, Toxic, Health Hazards, Recycling*

1. INTRODUCTION:

E-waste, or waste electrical and electronic equipment, is an emerging and fast-growing waste challenge to waste management in both developed and developing countries. Rapid technology innovation and ever-shortening product lifespan are among the factors contributing to the growing amount of e-waste. E-waste is growing, and with that surge comes the need for effective electronics recycling programs. E-Waste includes almost any household or business item containing circuitry or electrical components with either power or battery supply. “Electronic waste or e-waste describes discarded electrical or electronic devices. Used electronics which are destined for reuse, resale, salvage, recycling, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environmental pollution.” The e-wastes are dangerous, and on the basis of their condition and density the hazardous levels are marked. E-waste management has become a significant problem due to the technical prowess we have gained in the last century. Personal computers are an indispensable part of our lives, but they contain various toxic substances, such as toxic gases, chlorinated and brominated substances, toxic metals, acids, biologically active materials, plastics and plastic additives. When electronics end up in landfills, toxics like lead, mercury, and cadmium leach into the soil and water. The electronic waste problem is huge. E-waste accounts for approximately 40 percent of the lead and 70 percent of heavy metals found in landfills. These pollutants lead to ground water and air pollution and soil acidification. High and prolonged exposure to these chemicals/ pollutants emitted during unsafe e-waste recycling leads to damage of nervous systems, blood systems, kidneys and brain development, respiratory disorders, skin disorders, bronchitis, lung cancer, heart, liver, and spleen damage, the study added. Some computer components can be reused in assembling new computer products, while others are reduced to metals that can be reused in applications as varied as construction, flatware, and jewelry. Substances found in large quantities include epoxyresins, fiberglass, PCBs, PVC (polyvinyl chlorides), thermosetting plastics, lead, tin, copper, silicon, beryllium, carbon, iron, and aluminium. Elements found in small amounts include cadmium, mercury, and thallium. Elements found in trace amounts include americium, antimony, arsenic, barium, bismuth, boron, cobalt, europium, gallium, germanium, gold, indium, lithium, manganese, nickel, niobium, palladium, platinum, rhodium, ruthenium, selenium, silver, tantalum, terbium, thorium, titanium, vanadium. Almost all electronics contain lead and tin (as solder) and copper (as wire and printed circuit board tracks), though the use

of lead-free solder is now spreading rapidly. With more than 100 crore mobile phones in circulation, nearly 25 per cent end up in e-waste annually.

2. MATTER OF CONCERN:

The rising levels of e-waste generation in India have been a matter of concern in recent years. With more than 100 crore mobile phones in circulation, nearly 25 per cent end up in e-waste annually, it said. "India has surely emerged as the second largest mobile market with 1.03 billion subscribers, but also the fifth largest producer of e-waste in the world, discarding roughly 18.5 lakh metric tonnes of electronic waste each year, with telecom equipment alone accounting for 12 per cent of the e-waste," the study said. The Ministry of Environment, Forest and Climate Change has notified e-waste management rules, 2016, in which producers are for the first time covered under extended producers' responsibility (EPR). Waste collection target, The rules prescribe a waste collection target of 30 per cent waste generated under EPR for the first two years, progressively going up to 70 per cent in the seventh year of the rule. The rules prescribe stringent financial penalties for non-compliance. However, the study said the unorganised sector in India is estimated to handle around 95 per cent of the e-waste produced in the country. Given the huge user base and vast reach of telecom in India, it is practically difficult and expensive for the handset manufacturers to achieve the targets prescribed in the rules from first year, the study added. Phased manner "It is suggested that electronic waste collection targets are implemented in a phased manner with lower and practically achievable target limits. Also, detailed implementation procedures for collection of electronic waste from the market need to be followed," the study said. Rapid changes in technology, changes in media (tapes, software, MP3), falling prices, and planned obsolescence have resulted in a fast-growing surplus of electronic waste around the globe. Technical solutions are available, but in most cases, a legal framework, a collection, logistics, and other services need to be implemented before a technical solution can be applied. Display units (CRT, LCD, LED monitors), processors (CPU, GPU, or APU chips), memory (DRAM or SRAM), and audio components have different useful lives. Processors are most frequently out-dated (by software no longer being optimized) and are more likely to become "e-waste" while display units are most often replaced while working without repair attempts, due to changes in wealthy nation appetites for new display technology. This problem could potentially be solved with modular smartphones or Phonebooks. These types of phones are more durable and have the technology to change certain parts of the phone making them more environmentally friendly. Being able to simply replace the part of the phone that is broken will reduce e-waste. An estimated 50 million tons of E-waste are produced each year.

3. E- WASTE IN WORLD:

More than 20 million tons of e-waste are produced every year. Americans alone generate about 3.4 million tons of e-waste per year. If you put every blue whale alive today on one side of a scale and one year of US e-waste on the other, the e-waste would be heavier. The USA discards 30 million computers each year and 100 million phones are disposed of in Europe each year. The Environmental Protection Agency estimates that only 15–20% of e-waste is recycled, the rest of these electronics go directly into landfills and incinerators. At least 50% of Africa's e-waste comes from within the continent. China discards 160 million electronic devices a year. In 2006, the United Nations estimated the amount of worldwide electronic waste discarded each year to be 50 million metric tons. According to a report by UNEP titled, "Recycling – from E-Waste to Resources," the amount of e-waste being produced – including mobile phones and computers – could rise by as much as 500 percent over the next decade in some countries, such as India. The United States is the world leader in producing electronic waste, tossing away about 3 million tons each year. China already produces about 2.3 million tons (2010 estimate) domestically, second only to the United States. And, despite having banned e-waste imports, China remains a major e-waste dumping ground for developed countries. Society today revolves around technology and by the constant need for the newest and most high-tech products we are contributing to mass amount of e-waste. Since the invention of the iPhone, cell phones have become the top source of e-waste products because they are not made to last more than two years. Electrical waste contains hazardous but also valuable and scarce materials. Up to 60 elements can be found in complex electronics. As of 2013, Apple has sold over 796 million iDevices (iPod, iPhone, iPad). Cell phone companies make cell phones that are not made to last so that the consumer will purchase new phones. Companies give these products such short life spans because they know that the consumer will want a new product and will buy it if they make it. In the United States, an estimated 70% of heavy metals in landfills comes from discarded electronics. While there is agreement that the number of discarded electronic devices is increasing, there is considerable disagreement about the relative risk (compared to automobile scrap), and strong disagreement whether curtailing trade in used electronics will improve conditions, or make them worse.

4. HAZARDOUS COMPONENTS OF E- WASTE:

Hazardous components of electronic waste and where they are found Electronic waste or e-waste often has hazardous or toxic components that can have an impact on the environment once the materials end up in a landfill or if they are improperly managed and disposed. Below is a list of hazardous or toxic components of e-waste and where they may be found:

S. No	COMPONENTS	WHERE THEY ARE FOUND
1.	Antimony trioxide	a flame retardant, added to cathode ray tube monitor (CRT) glass, found in printed circuit boards and cables
2.	Arsenic	older cathode ray tubes and in light emitting diodes
3.	Barium	the CRT
4.	Beryllium	often allied with copper to improve copper's strength, conductivity and elasticity. Old motherboards, contact springs found in printed circuit boards, relays, and in the mirror mechanism of laser printers. In power supply boxes which contain silicon controlled rectifiers and x-ray lenses
5.	Cadmium	circuit boards and semiconductors Rechargeable NiCd-batteries, fluorescent layer (CRT screens), printer inks and toners, photocopying-machines (printer drums)
6.	Chlorofluorocarbon (CFC)	Cooling unit, Insulation foam
7.	Chromium	steel as corrosion protection, Data tapes, floppy-disks, circuit boards, photocopying-machines (printer drums)
8.	Cobalt	component in steel for structural strength and magnetivity
9.	Lead	cathode ray tubes, solder, batteries, printed wiring boards (circuit boards), solder on components
10.	Lithium	Batteries
11.	Mercury	switches (mercury wetted) and housing, fluorescent lamps providing backlighting in liquid crystal displays (LCDs) for monitors and laptops, batteries, printed circuit boards
12.	Nickel	batteries, electron gun in CRT , printed circuit boards
13.	Polybrominated flame retardants (including polychlorinated biphenyls (PCB), polybrominated biphenyls (PBB), polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), tetrabromo bis-biphenol-a (TBBA))	plastic casings, cables, and circuit boards, condensers, transformers
14.	Polyvinyl chloride (PVC)	Cable insulation
15.	Selenium	circuit boards as power to supply rectifier, photocopying-machines (printer drums)
16.	Zinc	interior of CRT screens, printed circuit boards

These substances are hazardous to the health and environment, as well. So, it becomes necessary to dispose off these e-wastes very cautiously.

4.1 E-WASTES DUE TO COMPUTER COMPONENTS:

A life without computer cannot be imagined today. They are commonly used in offices, schools, colleges, residences and manufacturing industries. The computer components contain e-toxic substances of a broad range.

- **Circuit Boards**- these include heavy metals like lead and cadmium
- **Batteries**- these include cadmium
- **Cathode ray tubes**- they contain lead and barium oxide
- **Coated on circuit boards, cables, and PVC**- Brominated flame retardant

- **Copper cables and plastic coated computers** - release toxic dioxins and furan when burnt
- **Flat screens-** mercury
- **Old capacitors-** PCB

It has been estimated that 286,700 kg of mercury, about 4 kg of lead, 2.87 billion kg of plastic and 716.7 kg of lead are present in 500 million computers, in the world. These heavy metals like lead contaminate the ground water and when burnt produce harmful effects like the emission of toxic fumes in the atmosphere.



Figure: E-waste of Computer

5. HAZARDOUS EFFECTS OF E-WASTE ON THE ENVIRONMENT:

Acidification of soil caused by the melting of computer chips is one of the most hazardous effects. Moreover, when computers are dumped in the ground leading to the pollution of water sources also. Due to contamination of water resources it is illegal to deposit and recycle e-waste in countries like Guiyu, Hong Kong. These areas now faces severe water shortage issues because of the acidification of the water sources. The recycling process means deposition of wastes in the rivers and water sources, which lead to its contamination. Now, water has to be supplied from far off places to meet the requirements of the people, who live there. It is not only the water is contaminated, but the air is also polluted when the e-wastes are burnt and it produces toxic fumes that mix up with the air. When the electronic devices are destroyed metals leach, for instance mercury from the circuits and the PCBs from the condensers. When plastics that contain cadmium are land filled, PDBE and cadmium leach inside the soil resulting in soil pollution.

5.1 HEALTH HAZARDS OF COMPUTER COMPONENTS E-WASTE:

- **Solder:** This is present in circuit boards, glass panels, gaskets and computer monitors. Solder contain lead that damage the nervous system, blood system, kidney and also affect the development of brain in children.
- **Chip resistors and Radium Conductors:** The cadmium present in these parts are dangerous to human because the toxins released cause neural damage and teratogenic effects in fetus.
- **Relays, Switches and Printed Circuit Boards:** Mercury present in these elements leads to brain damage, disorders in the respiratory system and skin diseases.
- **Corrosion Protectors:** Asthmatic bronchitis and DNA damage are caused due to the Hexavalent Chromium present.
- **Cabling and Computer Housing:** When burn these produce dioxin, which causes problems of reproduction, destruction of the immune system, and regulatory hormones are damaged too.
- **Circuit Boards:** The endocrine system's functions are interrupted because of the Brominated Flame Retardants.
- **Front panel of CRTs and Mother Board:** Skin and heart diseases, muscle weakness, lung cancer, chronic beryllium diseases are caused because of the presence of Beryllium.

6. BENEFITS OF RECYCLING:

Recycling raw materials from end-of-life electronics is the most effective solution to the growing e-waste problem. Most electronic devices contain a variety of materials, including metals that can be recovered for future uses. By dismantling and providing reuse possibilities, intact natural resources are conserved and air and water pollution caused by

hazardous disposal is avoided. Additionally, recycling reduces the amount of greenhouse gas emissions caused by the manufacturing of new products. Another benefit of recycling e-waste is that many of the materials can be recycled and re-used again. Materials that can be recycled include "ferrous (iron-based) and non-ferrous metals, glass, and various types of plastic." "Non-ferrous metals, mainly aluminum and copper can all be re-smelted and re-manufactured. Ferrous metals such as steel and iron can be also be re-used." "Due to the recent surge in popularity in 3D printing, certain 3D printers have been designed to produce waste that can be easily recycled which decreases the amount of harmful pollutants in the atmosphere. The excess plastic from these printers that comes out as a by product can also be reused to create new 3D printed creations. Benefits of recycling are extended when responsible recycling methods are used. Recycling aims to minimize the dangers to human health and the environment that disposed and dismantled electronics can create. Responsible recycling ensures best management practices of the electronics being recycled, worker health and safety, and consideration for the environment locally and abroad. In Europe, metals that are recycled are returned to companies of origin at a reduced cost. Through a committed recycling system, manufacturers in Japan have been pushed to make their products more sustainable. Since many companies were responsible for the recycling of their own products, this imposed responsibility on manufacturers requiring many to redesign their infrastructure. As a result, manufacturers in Japan have the added option to sell the recycled metals.

7. CONCLUSION:

E-Waste comprises of the electronic products that are no longer useful to us. Electronic waste, or e-waste, is an emerging problem as well as a business opportunity of increasing significance, given the volumes of e-waste being generated and the content of both toxic and valuable materials in them. E-waste is the most rapidly growing Environmental problem in the world, and India is no exception. E-waste has severe impact on our environment. We need to start using 3 R's- Reuse, Recycle and Reduce electronic products. So that the problem of e-waste will minimize and our Earth will not get damaged.

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Green Banking: Challenges & Opportunities

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Abstract: *The Banking industry plays an important role in economic growth and environmental protection by promoting environmentally sustainable and socially responsible institutions. The banking of this kind can be termed as “Green Banking”. Change is the need of the hour for survival in all spheres. Banks can provide important leadership for the required economic innovation that will provide new opportunities for financing and investment policies. Green Banking means combining operational improvements, technologies and changing client habits in banking business. Adoption of Green Banking practices will not only be useful for environment, but also benefit in greater operational efficiencies, a lower vulnerability to manual errors, fraud, and cost reductions in banking activities. This paper has made an attempt to highlight the major services, challenges, opportunities, strategies of Green Banks in India*

Key Words: *Environment protection, global warming, Green banking financial products, & sustainable development.*

1. INTRODUCTION:

Environment sustainability is the design and provision of products and services that incorporate and promote waste minimization, effective use and reuse of resources. Its aim is to protect the environment for the benefit of current and future generations. It is all about meeting needs and seeking a balance between people, the environment and the economy. According to the United Nations, sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development and preservation of environment are now recognized globally as overriding imperatives to protect our planet from the ravages inflicted on it by mankind. Various global initiatives are underway to counter the ill-effects of development that we encounter today such as carbon foot print, global warming, climate change, fickle weather, floods, droughts, pollution, high greenhouse gas emissions, etc., while still there is no consensus among the countries on sharing the burden of ecological footprint, most of the countries have been taking aggressive measures to tackle global warming and climate change. The banking industry influences both economic growth and development, both in terms of quality and quantity, leading to a change in the nature of economic growth. Therefore, banking sector plays a crucial role in promoting environmentally sustainable and socially responsible investment. Banks may not be the polluters themselves but they usually have a banking relationship with some companies/investment projects that are polluters or could be in future. Banks also contribute to ecological footprint directly and indirectly through investment/lending in their customer enterprises. As such they need to play a key role in optimizing /reducing the carbon footprint. It is said that what is not measured, is not managed.

1.1. CONCEPTS OF GREEN BANKING:

Green banking means promoting environment friendly practices and reducing carbon footprint from banking activities. This comes in many forms viz., using online banking instead of branch banking, paying bills online instead of mailing them, opening of commercial deposits and money market accounts in online banks etc., Green banking refers to the efficient and effective use of computers, printers and servers to optimize the use of energy and waste-less paper. One of the important ways in which banks can implement green banking is by promoting the use of online banking among customers. Online banking helps reduce paperwork and the need to travel to bank branches. This positively impacts the environment. This facility is beneficial for banks, as it reduces operational costs and increases efficiency. This concept

of “Green Banking” would be mutually beneficial to the banks, industries and the economy. Green banking will also ensure the greening of the industries but it will also facilitate in improving the asset quality of the banks in future.

1.2. CARBON FOOTPRINT

Is a measure of an organization’s or entity’s impact on the environment in terms of the amount of greenhouse gases produced, measured in units of carbon dioxide equivalent.

1.3. GLOBAL WARMING

Is a measure of rising average temperature of Earth’s atmosphere and oceans and its projected continuation. In the last 100 years, the Earth’s average surface temperature increased by about 0.8^oC (1.4 F) with about two-thirds of the increase occurring over in the last three decades. Most global warming is caused by increasing concentrations of greenhouse gases produced by human activities such as deforestation and burning fossil fuels.

1.4. CLIMATE CHANGE

Is the change in temperature and weather patterns due to certain human activity like burning fossil fuels. The changes include global average air and ocean temperature, widespread melting of snow and ice and rising global sea levels. Therefore, a common thread running across all these initiatives is the focus on reducing the demand for fossil fuels by implementing the 3R’s viz. Reduce, Reuse and Recycle.

2. CHARACTERISTICS& FEATURES OF GREEN BANKING:

Depending on the state, a green bank may conform to a variety of forms, utilize many different public funds, and create a diverse array of financial products. Banks may utilize financial tools such as long-term and low interest rate loans, revolving loan funds, insurance products and low-cost public investments or it may design new financial products. Ultimately, all green banks will exhibit several common characteristics:

- Stimulate demand by covering 100% of the upfront costs with a mixture of public and private financing.
- Leverage public funds by attracting much greater private investment for clean energy and markets.
- Recycle public capital so as to expand green investment and leave taxpayers unharmed.
- Scale-up clean energy solutions as fast as possible, maximizing clean electricity and efficiency gains.

2.1. EVOLUTION OF GREEN BANK:

First Green Banking was founded in 2009 in the state of Florida. Based in Eustis and Clermont, Florida, USA, First Green Banking is a customer-driven community bank providing personalized service, localized decision-making and proven technology by promoting a positive environment that is acceptable to the community. State Bank of India, India’s largest commercial bank, took the lead in setting high sustainability standards and completed the first step in its ‘Green Banking’ initiative with Shri O.P. Bhatt, Chairman, SBI inaugurating the bank’s first Wind farm project in Coimbatore. Recent Green Banking initiatives include a push for solar powered ATM’S , paper less banking for customers, clean energy projects and the building of Wind mills in rural India. SBI is a leader in Green Banking.

2.2. GREEN BANKING FINANCIAL PRODUCTS:

Green banking helps to create effective and far-reaching market-based solutions to address a range of environmental problems, including climate change, deforestation, air quality issues and biodiversity loss, while at the same time identifying and securing that benefit customers. Some of Green banking financial products includes: Green mortgages, online banking, remote deposit capture, green car loans and green credit cards.

- **GREEN MORTGAGES:** In general Green mortgages also known as Energy Efficient Mortgages(EEM’S), provide retail customers with considerably low interest rates compare market rates for clients who purchase new energy efficient homes or invest in retrofits, energy efficient appliances or green power. Banks can also choose to provide green mortgages by covering the cost of switching a house from conventional to green power, as well as include this customer benefit when marketing the product.
- **ONLINE BANKING:** Online banking, also known as internet banking, e-banking or virtual banking, is an electronic payment system that enables customers of a bank or other financial institution to conduct a range of financial transactions through the financial institution’s website.
- **REMOTE DEPOSIT CAPTURE:** Remote deposit capture (RDC) is a system that allows a customer to scan cheques remotely and transmit the cheques images to a bank for deposit, usually via an encrypted Internet connection. When the bank receives a cheque image from the customer, it posts the deposit to the customer’s

account and makes the funds available based upon the customer's particular availability schedule. Banks typically offer Remote Deposit Capture to business customers rather than to individuals.

- **GREEN CAR LOANS:** Many green car loans encourage the purchase of cars for below market interest rates, which demonstrate higher fuel efficiency.
- **GREEN CREDIT CARDS:** A green credit card allows cardholders to earn rewards or points which can be redeemed for contributions to eco-friendly charitable organizations. These cards offer an excellent incentive for consumers to use their green card for their expensive purchases.

3. GREEN BANKING OPPORTUNITIES:

A Green Bank requires each of its functional units and activities to be Green- environmentally friendly and help to improve environmental sustainability. Several opportunities are available for banks to go green their functional units and activities. Key among them are:



3.1 SUPPLY CHAIN MANAGEMENT(SCM)

SCM is the management of the flow of goods and services. It includes the movement and storage of raw materials, work-in-process inventory, and finished goods from point –of- origin to point- of-consumption. Interconnected or interlinked networks, channels and node businesses are involved in the provision of products and services required by end customers in a supply chain.

- Adopt techniques and plans to minimize inventory and wasted freight.
- Adopt networked design using a carbon foot print.

3.2. ENTERPRISE RESOURCE MANAGEMENT(ERP)

ERP is a category of business-management software, typically a suite of integrated applications that an organization can use to collect, store, manage and interpret data from many business activities, including product planning, purchase, manufacturing or service delivery ,marketing and sales, inventory management, shipping and payment.

- It facilitates paper less transactions.
- Adopt techniques for workforce and parts optimization as well as intelligent device management.

3.3. CUSTOMER RELATIONSHIP MANAGEMENT(CRM)

Customer relationship management is an approach to managing a company's interaction with current and future customers. It tries to analyze data about customers history with a company, to improve business relationships with customers, specifically focusing on customer retention, and ultimately to drive sales growth. One important aspect of the CRM approach is the systems of CRM that compile information from a range of different communication channels including a company's website, telephone, email, live chat, marketing materials, social media, and more. Through the CRM approach and the systems used to facilitate CRM, businesses learn more about their target audiences and how to best cater to their needs.

3.4. SOURCING & PROCUREMENT:

In business, the term sourcing refers to a number of procurement practices, aimed at finding, evaluating and engaging suppliers for acquiring goods and services. Outsourcing is the process of contracting a business function to someone else., select vendors for sustainability rating for their products, services and operations.

3.5. PRODUCT LIFE CYCLE MANAGEMENT:

In industry, PLC is the process of managing the entire lifecycle of a product from inception, through engineering design and manufacture, to service and disposal of manufactured products.

- Design and offer banking products & services in such a way that consume less resources and energy and thereby reduce carbon foot print.
- Implement effective systems for product end- of- life management that have minimal impact on environment.

3.6. GREEN BANKING SERVICES

Banks are developing new products and services that respond to customers demand for sustainable choices. Following are some of the options that banks should offer to their customers:

- Electronic and mobile banking facilitates customers to perform most of their bank needs anytime, anywhere.
- Automatic payments reduce the need to write and send cheques by mail.
- Paperless statements, product information guides and annual reports to customers and stakeholders.
- Offering and promoting mutual funds that focus investment in 'Green' companies.
- Credit cards and debit cards can be used while making the payment of various expenses without carrying money.
- Mobile banking is used for performing balance cheques, account transactions, payments, credit appliances etc.,
- via mobile phone or Personal Digital Assistant (PDA).

4. CHALLENGES OF GREEN BANKING:

While adopting green banking practices, the banks would face the following challenges:

- **REPUTATIONAL RISK:** If banks are involved in those projects which are damaging the environment they are prone lose their reputation. There are few cases where environmental management system has resulted in cost saving, increase in bond value.
- **DIVERSIFICATION PROBLEM:** Green banks restrict their business transaction to those business entities who qualify screening process done by green banks. With limited number of customers they will have a smaller base to support them.
- **START-UP FACE:** Many banks in green business are very new and are in start-up face. Generally it takes 3 to 4 years for a bank to start making money. Thus it does not help banks during recession.
- **CREDIT RISK:** Credit risk arises due to lending to those customers whose businesses are affected by the cost of pollution, change in environmental regulation and new requirements of emission level.
- **HIGH OPERATING COST:** Green bank requires talented and experienced staff to provide proper services to customers. Experienced loan officers are needed, they give additional experience in dealing with green business and customers.

4.1. GREEN BANKING STRATEGIES:

According to MdShafiqul and Prahalled (2013), green banking activities involve two major approaches i.e., green transformation of internal operation and environmentally responsible financing.

- **GREEN BANKING THROUGH INTERNAL OPERATIONS:** It means all bank should adopt green banking activities in their day to day operations. These include adopting appropriate ways to use renewable energy, automation and minimizing their carbon footprint. In the past few years, all the banks have incorporated paperless technologies in their internal operations to help the environment as well as provide their customers efficient and better services. In their day-to-day business operations, banks ordinarily generate carbon emissions through the usage of paper, electricity, stationary, lighting, air conditioning and electronic equipment. Green banking internal operations include on line account opening, online banking, mobile banking, net banking, electronic fund transfer as well as the use of ATM, cash and cheque deposit machines, credit and debit cards, e-statement SMS alert, mini image statement etc.
- **GREEN FINANCE:** Green Finance refers to banks that provide financial assistance to environmentally responsible projects. The purpose is to provide financial assistance to green technology and pollution reduction projects to reduce external carbon emissions. The bank support industries that are resource efficient and emit low carbon footprint. Priority is given to financing eco-friendly business activities and energy efficient industries such as waste water treatment plant, waste disposal plants, bio-gas plants, renewable energy projects, hybrid car projects and so on.

5. ENVIRONMENTAL MANAGEMENT BY BANKING INSTITUTIONS:

- Now a days, most of the commercial lending process in different parts of the world scrutinizes projects with a set of tools by incorporating environmental concerns in their day-to-day business. The financial institutions should encourage projects which take care of the following aspects while financing them.
- There should be an Environmental Impact Assessment (EIA) of each project recommending the measures needed to prevent, minimize and mitigate the environmental negative impact before financing the projects.
- While investing or funding the projects, the financial institutions should assess the sensitive issues like vulnerable groups; involuntary displacement etc and projects should be evaluated in terms of environmentally important areas including wetlands, forests, grasslands and other natural habitats.
- Banking institutions need to evaluate the value of real property and the potential environmental liability associated with the real property. Therefore, the banks should have right to inspect the property or to have an environmental audit performed through the life of the loan.
- Banks also need to monitor post transaction for the ideal environmental risk management program during the project implementation and operation. There should be physical inspections of production, resources, training and support, environmental liability, audit programs etc.
- The next round of evaluation includes loan structuring, credit approval, and credit review and loan management. Further banks have annual audits, quarterly environmental compliance certificate from the independent third party and also from the government.
- Further the banks can introduce green bank loans and products like:
- Investing in projects related to recycling, farming, waste disposal through reduced interest rates on loans to home owners for installing a solar energy system.
- Providing option for customers to invest in environmentally friendly banking products.
- Investing in resources that combine ecological concerns and social concerns.

6. MEASURES TO ENCOURAGING GREEN BANKING:

Banks are responsible corporate citizens. Banks believe that every small “GREEN” step taken today would go a long way in building a greener future and that each one of them can work towards better global environment. The purpose is to provide cost efficient automated channels and to build awareness and consciousness of environment, nation and society. Green banking is really a good way for people to get more awareness about global warming; each businessman will contribute a lot to the environment and make this earth a better place to live. Until a few years ago, most traditional banks did not practice green banking or actively seek investment opportunities in environmentally-friendly sectors or businesses. Only recently have these strategies become more prevalent, not only among smaller alternative and cooperative banks, but also among diversified financial service providers, asset management firms and insurance companies.

- Educate through the bank’s intranet and public websites.
- Construct a website and spread the news.
- Participate in events and communicate through press.
- Setup outlets to promote Green business.
- Carbon foot print reduction by mass transportation and energy consciousness.
- Impart education through E- learning programs.

7. CONCLUSION:

Possible policy measures and initiative to promote green banking in India has become the need of the hour. In a rapidly changing market economy where globalization of markets has intensified the competition, banks should play a pro-active role to take environmental and ecological initiatives. The banking and financial sector should be made to work for sustainable development. As far as green banking is concerned, Indian banks are running behind time and it is the need of the hour to think it seriously for the sustainable growth of the nation. Green Banking concept will be beneficial for both the banking industries and the economy. Not only “Green Banking” will ensure the greening of the industries but it will also facilitate in improving the asset quality of the banks in future.

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Stock Market Rejoinder towards Digital India Budge

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Abstract: *The sensitive nature of share market which is impacted by any government announcements. This paper aims to study the impact of BHIM app on market reactions. Government’s policies shape the environment in which the private and public sector operates. Policy decision of the government are governed by various objectives, be it economic or non-economic objectives. Market reaction to various announcements has been captured from time to time, both on the micro level as well as macro level.*

Key Words: *BHIM app, market reaction, economic event.*

1. INTRODUCTION:

Impact of an economic event on the value of firms has caught attention of economists from time immemorial, Craig Mackinlay (1996). Policy changes affect a firm in general and various sectors in particular, be it the change in tax structures, Sialm (2009), or changes in monetary policy including Federal fund rate and default spread, Patelis (1997) or changes in the interest rates, Joseph & Vezos (2006). Whatever be the policy measures, some reactions will always be there in the economy. Government’s policies shape the environment in which the private and public sector operates. By bringing in the changes in tax structures, increase and decrease in provision of subsidies, changes in the environmental policies, etc., the government policies directly and indirectly affects the stakeholders. And the best part is that the change is not permanent. For example, if a change is not able to make a positive impact or the impact it was intended to cast, it is further subjected to change. These constant changes bring shocks in the market and more specifically in the stock market. Policy decision of the government are governed by various objectives, be it economic or non-economic objectives. Overall the foremost objective is economic welfare with a constraint of political cost (or benefit) incurred by changing the policy. Stock markets react to these policy changes in its own peculiar ways. If the news of these changes leaks into the market, then market reactions are weak. On the other hand, there are tremendous ups and downs in the market, if these changes are sudden. But changes happen and they are a frequent phenomenon. Government takes a conscious decision to make or break a policy. With a change in the policy of the government, the move in expectation of the investors happens; prior beliefs about the new policy’s over-power the posterior beliefs about the old policies. From here emerges the significance of capturing these reactions in the context of stock market. This very fact establishes the relevance of doing the present study. A very bold and strategic move by the current government of India towards transforming India into ‘Digital India’ is one such macroeconomic event that is expected to impact various stakeholders, be it consumers, creditors, employees or investors. When Prime Minister Narendra Modi, on 14 April 2017 announced the launch of BHIM Aadhaar platform for merchants to facilitate digital payments and unveil cash back and referral bonus schemes, there were different reactions from the stakeholders. Most of the public sector banks adopted BHIM App for digital transfers. Out of 12 public sector banks in India, Kotak Mahindra Bank and Yes Bank have not opted for BHIM app as on date of research conducted.

2. RESEARCH GAP AND RESEARCH PROBLEM:

Market reaction to various announcements has been captured from time to time, both on the micro level as well as macro level. These announcements could be related to stock splits, Angle (1997) or earnings announcements, Jurgita

Stankeviciene (2014), mergers and acquisitions, Aristeidis G. Samitas (2007), etc. Many studies have been conducted to capture these reactions at firm level. But a very few studies have been done to capture market reaction to macro economic events, especially in the Indian context. Among various structural reforms that have taken place, since the modi government came to power, 'Digital India' move is coming to the forefront. There have been several initiatives taken in last three years including visvesvaraya phd scheme for electronics and IT, un-reserved ticket through mobile application (UTS app), umang, udaan, targeted public distribution system (TPDS), swayam, swatch bhaarat app sugamaya pustakalya, state wide area network, startup india portal and mobile app, soil health card, sms-based mid-day meal monitoring scheme, smart cities, single window interface for trade (SWIFT), shala siddhi, shaala darpan, saransh, project management system (PMIS), etc. The launch of BHIM APP is yet another mile stone in the wake of 'Digital India' move. Since digital India move in itself is a first time move in India economy at such a large scale, it becomes imperative to study the implications of this big move. This fact establishes originality of the current study. Thus, this research work adds to the current literature by taking up the issue of digital India move and assessing its impact on the stock market at macro level. Thus, it contributes in understanding the perspective of market reaction to such a move. At the same time, it fills the gap in the literature by doing a research on the macro level policy changes on stock market. Also, such a study will be counted as the first mover in the wake of digital India move focusing of the announcement of BHIM APP.

2.1. OBJECTIVES OF THE STUDY:

Main objective of the study to find out market reaction to the announcement of BHIM APP in India.

3. RESEARCH METHODOLOGY:

The impact of announcement of BHIM APP on banking sector was captured using event study methodology. Event study methodology is a well-established methodology to capture the impact of any announcement on stock market as documented by Brown & Warner (1980); Bowman (1983), MacKinlay (1997). To conduct an event study, the following terms were defined: Event of interest, Event Window, Estimation Window, and Estimation Model. The event of interest for the present research study is the announcement of BHIM APP in India (Day 0). The event window has been chosen as -20, through 0, to +20. Here, 0 depicts the announcement date, -20 is the 20-day time period prior to announcement date, and +20 is the 20-day time period after the announcement date. This window of short period also serves the purpose of keeping a clean window, which is not contaminated by other announcements during that period. The estimation window used for the study is from day -171 to day -21 (from 21 to 171 days prior to the event window), thus comprising of 151 trading days. NIFTY 50 has been selected as the Market INDEX due to various reasons; first, NIFTY 50 is a diversified 50 stock index accounting for 12 sectors of the economy which is used for a variety of purposes such as benchmarking fund portfolios, index based derivatives and index funds. Second, it represents about 62.9% of the free float market capitalization of the stocks listed on NSE as on March 31, 2017. Third, total traded value of NIFTY 50 index constituents for the last six months ending March 2017 is approximately 43.8% of the traded value of all stocks on the NSE.

The null hypotheses were formulated as:

- H01: Average abnormal returns to the shareholders of all banks after the announcement of BHIM App are zero.
- H02: Cumulative average abnormal returns to the shareholders of banks after the announcement of BHIM App are zero.

The traditional single factor market model was used to estimate the alpha and beta for the estimation window. It involved the regression of a banking sector's returns against a market index. For the present study, the value weighted market index NIFTY 50, Rani, Yadav, & Jain (2008) was used for regression. Alpha and beta values obtained from the market model were used to forecast expected returns for the event window i.e., -20 to +20 days. Residuals or abnormal returns (difference between actual and expected returns) were obtained. These abnormal returns were calculated for all the banks and later on averaged and named AARs (average abnormal returns). Further, CAARs (Cumulative average abnormal returns) were calculated to see the cumulative effect of such announcement. These AARs and CAARs were tested for statistical significance using parametric t test.

4. FINDINGS OF THE STUDY:

Results of t test showed that AARs and CAARs were not significant, thus, the null hypothesis could not be rejected. The study shows that there is no impact of announcement of BHIM APP on Indian stock markets as there is no evidence of abnormal returns as well as cumulative abnormal returns on or around the event date.

5. IMPLICATIONS OF THE STUDY:

Findings of this paper are consistent with the previous studies, in that there is no impact of policy announcements on stock market in the 'short run'. As this study has captured the short-term impact of digital announcement (BHIM APP), the market reaction has been captured in terms of its impact on returns. The sample includes banks, which have already adopted BHIM app for digital payments. The study finds that the announcement of BHIM app for digital payments does not affect the shareholders wealth in India. There is no consistent pattern of positive/negative average abnormal returns during the pre-announcement window till the announcement day and at the same time, no consistent pattern of positive/negative average abnormal returns during the post-announcement window. On cumulating these results, the shareholders of these banks have not been able to gain significant returns. The justification for such results seems to be that the information about the announcement of BHIM app reached the investors prior to the decision date as this news was in the open domain. Also, BHIM APP was in continuation of the existing digital India move and it was not a sudden announcement. It is proven in empirical researches that stock markets react to the sudden announcements or events. Thus, the findings of the current research are in line with the previous studies in this domain. Another view is that the investors were not very speculative about this move. BHIM APP in itself is a very welcome move but if the investor's perspective is concerned, they are not affected by this move. So in case we are too optimistic about any policy change that happens in the economy, it is suggested that we should be patient and not expect immediate results. The results of this study would help policy makers, government and the banks that have adopted BHIM APP. Adding to the implications of this study, the announcement of BHIM App has not cause any speculation in the market. As far as the long term effect of this policy change is to be observed, it is still to be tested and this gives future scope of the study i.e., to study the impact of announcing of BHIM App in the long run over larger event window.

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Strategic technological integration: A key for Sustainable Development

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Abstract: *Many of the researchers have tried to describe the strategy in general as defining objectives, goals and subsequently coming out with plans and procedures to achieve the same. Also ,sustainable development is something that deals with the long term survival. In fact, proper strategy formulation is going to trigger the sustainable development. However, today’s corporate world is changing at a lightning speed, due to the need of customized demand of the consumer for instance. The technological aspects and up gradation plays a vital role in meeting this speedily changing needs of the business fulfillment. Therefore, there arises a great need to integrate strategy formulation with the technological aspects in order to achieve sustainable development.*

Key Words: *Strategy, Technological up gradation, customization, sustainable development*

1. INTRODUCTION:

The researcher in the paper has tried to discover the gap existing in the literature on strategy. Strategy is a plan of action of an organization in anticipation of future outcomes .Primitively the applicability of the strategy concepts seems to be quite feasible. But today, there arise a gap when relied only on plan of action without taking into account technological advancements. Continuous technological advancements is the need of the hour which needs to be absorbed in the fundamental stage of strategy formulation. Ultimately, the conglomerate will drive the business to develop sustainably.

1.1. STRATEGY

Strategy is often stated as long term course of actions or moreover the plans anticipated for future situations. No doubt; to be prepared for the undesirable future situation is quite fair and necessary as per the definition, but, to think on it critically needs to take into account the technological development aspects as the core of strategy formulation. Business strategy is believed to be the pattern of decisions taken in a company that determines its objectives and drafts the policies and procedures to for achieving those. It also defines the business to be carried out , the kind of organization it wants to be in future. In general, strategy is said to be the decision that will be effective over long periods of time and also commits some of its resources to produce expected outcomes at certain point of time in future. Limitations of resources for any organization today fall in the scarce group which drives the need to formulate strategies. Moreover strategy is deciding the routes and aligning the resources to attain the destination. Whatever probable barriers maybe, strategy consist of plan of action to face and nullify this barriers. In other words strategy can be said to be the ay of adaptation to the situations that prevails as far as the resources and the environment is concerned. To the great extent strategy has been described as a process consisting of two processes; strategic planning and strategic thinking.

1.2. SUSTAINABLE DEVELOPMENT AND STRATEGY

As defined in the Brundtland report, Sustainable development is a way of meeting the currents without compromising the ability of future generations to meet their own needs. Further more sustainable rests on three

dimensions; the economic dimension, the societal dimension and the environmental dimension, In sustainable development emphasis is on the attainment of long term goals as against long term and takes into consideration the balanced development in the three dimensions as given above. It tries to integrate the environmental, social and economic impacts to achieve the defined goals and objectives and accordingly plan operating policies and procedures.. Development of this type is a complex process of interaction between public authorities, civil society, and the private sector. meaning of sustainability is similar to sustainable development, but is used when the focus is smaller, like sustainability of the companies or we may say sustainability or viability of the projects. To arrive at the meaning as per the description of sustainability or sustainable development only and its implementation alone will obviously fall short of without the technological integration according to the researcher. Fairly, Sustainable development is the organizing principle for meeting human development goals while at the same time sustaining the ability of natural systems to provide the natural resources and ecosystem services upon which the economy and society depend. The desired result is a state of society where living conditions and resource use continue to meet human needs without undermining the integrity and stability of the natural systems but in a consistent way. For survival of the business organization not consistent development but accelerated development is a way for sustainable development which is dependent upon the technological integration into the process of achieving sustainability.

1.3.NEED OF TECHNOLOGICAL INTEGRATION INTO STRATEGY FORMULATION:

In today's dynamic and competitive corporate world, technological up gradation stands as one of the important aspects for business to remain competitive and so strategic. Formulating strategies to be implanted as per the traditional definition will create gap in the achievement of planned policies and procedures unless and until integrated with technological integration. Customized demands today needs strategy integrated with technology homogenously. Enter the 21st century and customers are now demanding want they want and not what industry could produce, more customized and personalized items. Obviously, strategy designed by the organization might feel less applicability if not taken into account customization era and so the need to integrate technological aspects into strategy formulations. Also according to previous research on the importance of technology shows that, the person who customizes and orders the products or services online are more likely to purchase the products or services. Consumers are now expecting product customization and forward-thinking merchants realize the need to satisfy this growing demand for choice.

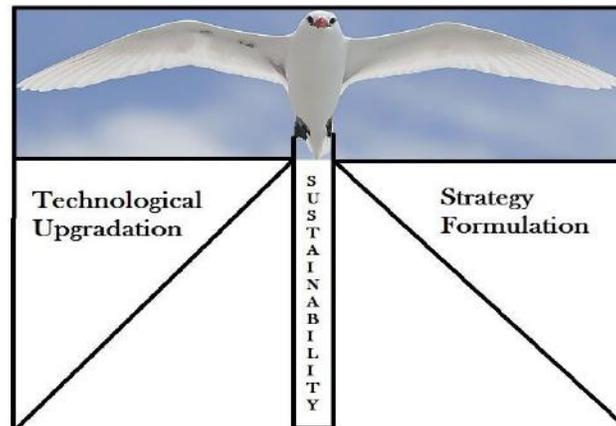


Figure 1: Sustainability=Technological integration+Strategy formulation

In other words it can be arrived that unless and until there is strategic technological integration instead of strategy or technological up gradation individually there will be existence of a gap in the attainment of sustainable development. That is, strategy formulation and technological integration are the two vitalities (wings) of an organization (bird) that strives to achieve sustainable development (sky fly).

2. RECOMMENDATIONS:

Strictly, for a business to be sustainable and successful in the long-term there should be continuous technological development. Strategy formulation should be collimated with the technological integration. Today there is a need to a larger extent that the organizations develop strategies giving it an effect to customization era and so it gives rise to the need of technological integration. Clearly not only strategy formulation but the strategic technological formulation and implementation are a key to survive for long term. Also, this required integration will drive the process of sustainable development to the more realistic approach.

3. CONCLUSIONS:

It can be concluded that there should be simultaneous development and implementation of strategy and technology within an organization. Working with either will reverse effect the organizational development analogous to an injured bird flying with one wing.

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Rural Development through Agri-preneurship- Opportunities and Challenges

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Abstract: India with a land area of 2.97 million sq. km., 180 million hectares of arable land (11% of the world), 56 million hectares irrigated land. India is the largest producer of milk and second largest food producer in the world. It is estimated that a one per cent growth in agro processing has the potential to generate an additional direct employment for 0.5 million people, and indirect employment for 1.5 million individuals. India has huge supply advantages due to diverse agro-climatic conditions and wide ranging raw material base. India's geographical situation gives it the unique advantage of connectivity to Europe, the Middle East, Japan, Singapore, Thailand, Malaysia and Korea. Globally, most of the countries import from countries that are geographically closer. This paper studies various opportunities available in dairy, Poultry and fruits and vegetable processing industries in India

Key Words: Agripreneurship, Agrobased industry, Agro processing industries, dairy, Poultry, fruits and vegetable processing industries opportunities

1. INTRODUCTION:

India witnessed rapid growth in agro sector specifically 1980s. It followed the first phase of the Green Revolution that resulted in increased agricultural production. The importance of the sector was realized by the business community leading to diversification from grain trading to processing. The emphasis was given by the rice processing industry, followed closely by wheat milling, paper and pulp industry, milk processing sector, jute industry, sugarcane processing and oils extraction through solvent plants. In some areas like the solvent extraction industry, the growth in installed processing capacity has been far higher than the supply of the raw materials. However, in other areas like fruits and vegetable processing, the growth has not been encouraging on account of poor demand for processed products by the consumers. In such cases, the industry has also not been able to develop the demand adequately. India's agriculture sector has an impressive long-term record of taking the country out of serious food shortages despite rapid population increase. The main source of long-run growth was technological augmentation of yields per unit of cropped area. This resulted in tripling of food grain yields, and food grain production increased from 51 million tonnes in 1950–51 to 217 million tonnes in 2006–07. India is the largest producer of milk in the world and second largest producer of food grains, sugar cane, fruits and vegetables in the world. But till in India the processing of agro-produce is very low, Fruits and Vegetables (2.2%), Poultry (6%), Milk (35%) as compared to developed countries (60 to 70%). In nearly three decades, the structure of rural employment has not changed much. According to the NSS figures, agriculture continues to employ 70% of our rural workforce, industry (14.4%), and services (14.8%) make up for the rest. However, in view of the decline in agriculture's contribution to GDP and the near constant proportion of workers dependent on it, there is need for rapid generation of employment. The real potential for employment generation, however, rests with the agro-processing industries. In developing countries like India, agro-processing industry is a very important arm of the manufacturing industry to build on the industrial capabilities.

2. REVIEW OF LITERATURE

Kacharu (2004), in “Agro-Processing Industries in India—Growth, Status and Prospects” provides a summary of the growth history of the sector covering role of R&D, recent trends vis-a-vis crop-wise status of agro processing

industrialization and problems, export trends, SWOT analysis and thrust areas for future for achieving greater role of this sector in the national economy. He suggests making National plan for improvement and extension of agro-processing technology at farm, traditional small industry and modern industry levels should be prepared. The plan should take into account the diversity in resources and needs of different regions in the Country. It should include programme details and implementation schedule for the first four or five years. The progress of plan implementation should be periodically reviewed to allow adjustments and corrective measures, and to develop programme details for the years beyond the period under review. Kar and Mishra (2004) has stressed in his book "Agro industries & economic development" that setting industries which make use the produces of agriculture directly or indirectly are considered more desirable in the context of the economic development of the country. Such a development has a two way effect i.e. Agriculture helps agro-related industries to make use of the raw materials directly supplied by this sector and it facilitates the growth of those types of industries which produce several inputs like fertilizer, pesticides and agricultural implements that help to promote the productivity and expansion of agriculture. Himanshu (2006), study on "Agribusiness management: Problems and prospectus" deals with the problems prospects and other related operational aspects involved in setting up new agro-industrial projects in India. Suggestions and policy recommendations for the growth of agro-industries in India have also been made in this study. Shehrawat (2006), in his study of Agro Processing Industries---A Challenging Entrepreneurship For Rural Development found important areas of training preferred by entrepreneurs were quality management, marketing management, packaging techniques, marketing techniques, technology up gradation, financial management, brand promotion, export promotion technique, advertising the products and personnel management. The study further revealed that 'lack of physical facilities', 'lack of sufficient stock of raw material', 'lack of managerial competence', 'poor attention on advertisement and publicity of the products', 'poor working of various industrial agencies,' 'lack of cooperation and coordination among different developmental agencies,' 'technological gap', 'lack of sufficient working capital', 'problems in procuring finance from different financial institutions,' 'cheaper/ superior competitive substitute,' 'inadequate supply of export information', 'power supply inadequate, uncertain and costly', 'preparation, identification and implementation of the project', 'licensing and registration', 'poor linkage with marketing structure', and 'lack of govt. support and incentives' constituted very serious problems encountered by entrepreneurs for a sustainable unit. Baharul (2009), in his doctoral research on Small Scale And Cottage Industries In Mizoram - Problems And Employment Prospects argues that Small scale industrial sector faces a number of difficulties in marketing their products due to growing competition among themselves and in recent years due to the emergence of stiff competition from foreign goods in the era of liberalization. It is due to weak financial base of the small scale units they cannot afford to spent as heavily as the large units does on marketing their product. Owing to the limited resources and lack of experience small scale units cannot incur heavy selling cost on publicity, advertisement and other sales promotion measures. Moreover, market analysis is almost absent in the sector which leads to failure in marketing the products. Many problems which the SSI units face in marketing their products related to lack of demand, poor quality and design, poor bargaining power, poor service to customers, brand preferences and ignorance of potential market areas, etc. In absence of a marketing channel and cooperatives for selling of their own products, most of the small scale and cottage industrial units in rural areas are forced to sell their products produced to the middlemen or money lenders to whom they depend for finance and raw materials at low prices due to poor bargaining power. Many small scale units even in urban areas sell their products to large industrial houses having wide and improved marketing network. The well known business house of the country like Britannia, Bata, and Hindustan Unilever etc. markets a good number of products produced by small units. Thus the large companies make huge profits from marketing the products of small scale units by charging much higher prices from the consumers. Therefore, there is a need for a larger number of marketing consortiums for marketing promotion of the products of small industrial units.

Ahulwalia (2011), in the research article on , " Prospects and policy challenges in the 12 fifth plan" says that the shift of labour out of agriculture follows from the fact that productivity in the agriculture is relatively low and if agriculture is not expected to grow at more than 4% a natural movement to higher paid employment in non-agriculture sector. Agricultural development will itself give rise to new demands for non-agricultural services and generate employment in agriculture related sectors such as modernized marketing and Agro-processing activities Dhiman& Rani (2011) in the paper Problems and prospects of small scale agro based industries: an analysis of Patiala district explains that agro-based industries are essential ways for the attainment of national objectives, especially poverty alleviation and economic development in the rural areas. However these industries are facing several problems such as – Infrastructural problem, Lack of proper Skills, Upgrading technological, Support services etc. Although some of the problems could be dealt with by the industries and also requires government intervention and the cooperation and support of international agencies. At this crucial juncture, the challenge in front of entrepreneurs of the agro based units i.e. rice mill units is to produce rice for 1.2 billion people of our country because scarcity can cause considerable distortions in any

country. Patiala district most of the agro-based industries are located in rural areas where all weather transport facilities are greatly lacking. The quality of services is also very poor and irregular – not available at the time of their need. This not only creates problems in transporting the final industrial products to their destination, that is, to the market centres and ports in the case of exportable products, but also disturbs the collection of inputs for processing. Hence, the need of the hour is the with a greater emphasis on the problems faced by agro based units, require a well furnished governmental policy, It lies in the long term interest of the entrepreneurs to actively contribute in bringing the above to fruition Shoji LalBairwa ,KerobimLakra, S. Kushwaha , L. K. Meena and Pravin Kumar (2014), in the paper titles Agripreneurship Development as a Tool to Upliftment of Agriculture, says that Agripreneurship have the potential to contribute to a range of social and economic development such as employment generation, income generation, poverty reduction and improvements in nutrition, health and overall food security in the national economy. Agripreneurship has potential to generate growth, diversifying income, providing widespread employment and entrepreneurial opportunities in rural areas

2.1 OBJECTIVES OF STUDY

- To analyze the problems of small scale agro-base industries.
- To study future prospects of small scale agro-base industries.

2.2 HYPOTHESES

- The profitability of small scale agro-base industries and the problems faced by these industries are co-related.
- Timely suggested measures promote growth of small scale agro-base industries.

3. RESEARCH METHODOLOGY:

The universe under the present study spread over Ahmednagar district in Maharashtra. It covers all small scale agro-based industries ,which are working at the time of survey and are registered with District Industries Centre (DIC) , Ahmednagar. The total population of registered Small Scale Agro-Base Industries inAhmednagar district is 925 out of 100 industries selected as a sample size with simple random sampling. Primary data collected through structured questionnaire and interviews with directors and managers of agro-based Small Scale agro-base industries.The secondary data collected through various research journals, Books, Government reports, Company reports, Ph.D thesis and websites.After collection of primary data, it has fed into the statistical software SPSSV-17. The Further analysis done with the help of simple frequency table, cross tabulation, Bi-variate analysis, and various percentage tables. To check the hypotheses, Spearman's co-relation coefficient test is used..

4. DATA ANALYSIS:

Objective No.1 : To analyze the problems of small scale agro-base industries

Almost fifty-one problems were framed and recorded under five points rating scale that were 1- No Problem to 5- Very High Problems. Sample analysis of average problems as below:

Table No.2 :Overall Problems Faced By Small Scale Agro-Base Industries

TYPE		Prod_ Problems	Finance Problems	HR Problems	Marketing Problems	Other Problems	Overall Average
DAIRY BASED	Mean	2.6154	3.2333	2.4250	3.7833	1.4444	2.7003
	N	30	30	30	30	30	30
	Std. Deviation	1.04695	1.12750	0.74466	.86805	.26109	.74223
POULTRY BASED	Mean	2.7365	3.5143	2.4964	3.5959	1.2127	2.7112
	N	35	35	35	35	35	35
	Std. Deviation	0.61220	.68316	0.51493	.71951	.17542	.42409
FOOD BASED	Mean	2.3077	2.7000	2.1679	3.7735	1.6810	2.5260
	N	35	35	35	35	35	35
	Std. Deviation	.52901	.78309	0.40781	.55962	.32932	.32390
Total	Mean	2.5501	3.1450	2.3600	3.7143	1.4461	2.6431
	N	100	100	100	100	100	100
	Std. Deviation	0.76175	.92944	.57578	.71673	.32641	.51638

The small scale agro-base industries facing average problems of Production, Finance, HRM and high problems of Marketing.

Objective No.2: To study future potential of small scale agro-base industries.

Table No.3 Perception Of Entrepreneur About Future Potential To Dairy-Based Industries

Dairy					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	19	19.0	19.0	19.0
	1 Yes	81	81.0	81.0	100.0
	Total	100	100.0	100.0	

(Source: Survey Data)

With above analysis 81% respondent say that there is great future potential in dairy based industry

Table no 4: perception of entrepreneur about future potential to poultry-based industries

Poultry based					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 No	56	56.0	56.0	56.0
	1 Yes	44	44.0	44.0	100.0
	Total	100	100.0	100.0	

With above analysis 56% respondent says that there is no great future potential in Poultry based industry.

Table no 5. Perception of entrepreneur about future potential to food-based industries

Food Based					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	100	100.0	100.0	100.0

(Source: Survey Data)

With above analysis 100% respondent says that there is great future potential in Food based industry.

- **Hypotheses 1, : The profitability of small scale agro-base industries and the problems faced by these industries are co-related.** The co-relation between average problems faced by small scale agro-base industries and average profits of last three years was measured through Spearmans co-relation coefficient method at 0.01% level of significance and found significant negative relationship. Spearman’s correlation coefficient (-0.541) Hence Null hypotheses there is no relationship between profitability of small scale agro-base industries and the problems faced by these industries is rejected and the alternative hypotheses, There is significant relationship between profitability of small scale agro-base industries and the problems faced by these industries is accepted.
- **Hypotheses : 2** Timely suggested measures promote growth of small scale agro-base industries.74% Entrepreneurs strongly agree that timely suggested measures promote growth of small scale agro-base industries. (One Sample-t test at 95% level of confidence found significant)

5. FINDINGS AND SUGGESTIONS:

- In the surveyed units it was found that small scale agro-base industries faces moderate problems of electricity, water, availability of raw materials and packaging of product while low problems of product manufacturing, material management, technology up gradation, inventory management, availability of land, maintaining quality of product. For creating industrial culture in any reason infrastructural facilities are required without these no industrial enterprise can survive and sustain for long. As regards infrastructural problems of Ahmednagar district is concerned the facilities provided by industrial estates is not adequate. Many industries have been set up by the entrepreneurs as their own efforts and availability of land. Due to this there is not any proper connectivity among these industries.
- With the research it was found that small scale agro-base industries faces high problems of availability of finance in time, problems of finance management, problems in getting sufficient finance and problems related to varied

interest rates of various financial institutes. As compared to dairy and food industries, poultry industries facing more problems related to finance. It has also been found due to financial constraints these units are not running smoothly.

- Small scale agro-base industries faces high problems of availability of unskilled and skilled labour, while moderate problems of salary and wages of daily wages works. The main asset of any enterprise is its manpower. If industries get right number and skilled manpower the profitability and productivity enhance manifold. In agro based industries of Ahmednagar district the industries have to hire many times labour from other states at very high prices. After that some time labours have to impart training also which enhances the cost of the unit as well.
- Small scale agro-base industries faces moderate problems of Market Potential, Market demand and Marketing Research. The small scale agro-base industry faces high problems of competition, Pricing of Product, Managing a channel of distribution, advertising, Sales promotion, Branding, Marketing Communication, Public relation and customer relationship management.
- Small scale agro-base industries not uses any kind of paid advertising. Many of these industries not think about branding of their product.
- Entrepreneurs are not aware simple techniques of branding of creating slogan, symbol for brand identity. Many of these industries not making planned communication program to communicate their product to the target customer.
- There is negative correlation between profits of small scale agro-base industries and problems faced by small scale agro-base industries.
- Through review of literature and discussion with entrepreneurs, the food industries having high future potential.
- The small scale entrepreneur should concentrate three important tools of communication of their product to their target customer, that are Advertising, Branding and Public relation.
- There are some low priced innovative tools of advertising like social networking websites, E-mail Advertising, SMS advertising, that should be used according to the target customer.
- Now the world is moving towards branded product, so small scale entrepreneur should concentrate to build their brand in the minds of target customers.
- There are great potential for food processing industries in India. The proper training should be given to the farmers to establish the processing unit in the village and as per the need easy process of licensing and finance should be established.
- The basic facilities like Electricity, Water, Transportation, Roads, Communication, security and cold storage facility should be provided.

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**A Study on Problems, Confrontation and empowerment Of Farmers towards
Pomegranate Cultivation”**

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Abstract: India has always been known in the world for its Rural Based Economy, as nearly 65% of its population is dependent on Agriculture & other rural businesses. According to the census of India, 2011, the population of India is more than 1.21 billion and out of it 72.2% population belongs to the rural area. So, the Analysis of the rural development is very much required in India. One of the oldest known fruits, found in writings and artifacts of many cultures and religions, the pomegranate (*Punicagranatum*) is an original native of Persia. Maharashtra is the leading producer of pomegranate followed by Karnataka, Andhra Pradesh. Ganesh, Bhagwa, Ruby, Arakta and Mridula are the different varieties of pomegranates produced in Maharashtra. In India, pomegranate is commercially cultivated in Sholapur, Sangli, Nasik, Ahmednagar, and Pune. Cultivation of pomegranate in rural area is one of the fastest growing segments within agricultural sector in India today. Now days pomegranate cultivation in rural areas has increases tremendously as many farmers view pomegranate as money machine as lot of income is generated by pomegranate. Pomegranate cultivation in rural area gave helping hands to the educated & uneducated people who are unemployed. Due to cultivation of pomegranate farmers earns good profit because of which farmers are satisfied within their social & economic life.

Key Words: pomegranate cultivation, economic empowerment, confrontations

1. INTRODUCTION:

1.1. ORIGIN OF THE RESEARCH PROBLEM:

The agriculture and allied sector continues to be pivotal to the sustainable growth and development of the Indian economy. Not only does it meet the food and nutritional requirements of 1.3 billion Indians, it contributes significantly to production, employment and demand generation through various backward and forward linkages. **Moreover, the role of the agricultural sector in alleviating poverty and in ensuring the sustainable development of the Economy is well established.** The sector is, however, currently facing a dilemma. While it has made large strides in achieving the agricultural development goals of food security, availability and accessibility, it is still being challenged by a formidable agrarian crisis. This situation has recently led to fresh thinking on the developmental approach in the agriculture sector. **The need for focusing on the welfare and prosperity of farmers has gained prominence.** In this fresh approach, priority is to be accorded to making the agriculture and allied sector not only ecologically sustainable in its use of natural resources of soil, water and forests, **but also socio-economically sustainable to farmers in terms of prosperity, welfare and social security.** Innovating managerial solutions to maximize farmers' welfare—rather than relying solely on modern farming to raise productivity and production—is the clarion call of the day. **The farmer Welfare-centered approach to agricultural development can empower the rural masses with higher income and employment and make balanced development a reality.** Hence, in policies of poverty alleviation and enhancing sustainable development, agriculture has enormous potential. **o.** Against this backdrop, policies and programmes formulated by the government have focused on increasing farmers' welfare through improved employment opportunities, better farm practices, improving soil health, increasing investment, creating rural infrastructure, ensuring timely delivery of credit and technology, encouraging market reform and reducing risk in agriculture through the introduction of a new insurance scheme. It is also recognized that the future of agriculture lies in shifting focus beyond farming and towards development of food systems, full agri-value

chains. The process also entails the creation of a large number of —near-farml jobs in post-harvest management, food processing, logistics and modern retail, i.e., by procuring directly from farmers' groups. Development of these efficient value chains will not only help move people from farm jobs to near-farm jobs but also enable farmers to realize Interdisciplinary relevance

2. REVIEW OF RESEARCH AND DEVELOPMENT IN THE SUBJECT:

2.1. INTERNATIONAL STATUS:

Mr. H. Pala, A. Tatli, C. Yilmaz, A.I. Özgüven in 2006 presented & publishes a paper on Important disease of pomegranate fruits & control possibilities in Turkey'. The researchers suggested measures so that farmers can control the various diseases of pomegranate plant and they get yield healthy & high quality of pomegranate.

2.2. NATIONAL STATUS:

- Miss. Rajeswari S Raina in 2003 presented a paper on _Technological and institutional innovations: a case study of pomegranate production and marketing'. She did the study inTippehalli village of Sholapur district. The major findings of the paper were there are so many changes that have taken place in the production and marketing of pomegranate in the semi-arid region of Maharashtra. Pomegranate cultivation literally transformed these areas and the livelihoods of poor households who depend on dry land agriculture. As a result of these changes rural migration during the dry season has virtually stopped.
- Mr.G.K. Vasanth Kumar in 2009 published a paper in which he did the study on Pomegranate is an important fruit crop grown in the dry regions of India. The findings of the paper were developments of varieties such as Ganesh, Mridula (Arakta), Ruby, Bhagwa (Kesar) have revolutionized pomegranate cultivation in Karnataka state. Government intervention in providing technology and training has given a boost to the farmers to take up pomegranate cultivation for export purposes as well. Post-harvest management, marketing and research support will go a long way in developing pomegranate crops in the dry areas and help the farmers in getting better returns'.
- Mr. H.P. Singh in 2011 published a paper on _horticulture research & development in India-with special reference to pomegranate & other minor fruits'. The major findings of the paper were In Maharashtra state pomegranate cultivation is increasing as a result of 70% of the total area contributing pomegranate cultivation. As a result of this in large amount pomegranate is export from Maharashtra state to other states & in other countries.
- Mr. Dr. J. R. Bhor & Dr. D. D. Pawar in 2012 presented paper on —A study of Pomegranate growers in Ahmednagar district of Maharashtra statel The major findings of the paper were there is considerable increase in area under pomegranate in Maharashtra state. Within Maharashtra state Sholapur, Nasik, Ahmednagar, Sangali and Pune districts are leading in pomegranate cultivation. It is due to the subsidies sanctioned by government of Maharashtra the pomegranate cultivation is increased. During the year 2001 to 2010 area and production of pomegranate increased near about two times. India is the world's leading pomegranate producer and produces nearly 50 % of words pomegranates.

3. SIGNIFICANCE OF THE STUDY:

- The study would enable us to study Pomegranate cultivation trend in Akole taluka
- By using trend Analysis it would help to understand Pre and Post Harvesting Problems
- To comprehend Confrontations of the Farmers
- It would be an attempt to study Whether Pomegranate Cultivation had lead to Economic empowerment Of Farmers

3.1 OBJECTIVE

- To study the Socio Economic Profile And Cultivation trend of Ahmednagar District towards Pomegranate Cultivation
- To learn the role of government agencies & government schemes in development of pomegranate cultivation.
- To find out the motives for choosing Pomegranate Cultivation.
- To Know the Problems and confrontations faced by the Farmers towards Pomegranate Cultivation
- To gauge the Economic Empowerment of the Farmers Cultivating Pomegranate

4. METHODOLOGY:

Type of Research	Descriptive Research
Area of study	Ahmednagar District
Collection of Data	
	Primary Data
	Secondary Data
Respondent	Farmer
Universe	Farmers Cultivating Pomegranate having Land Holding of above 5 Acres Only
Sample	Selected Farmers with Land Holding of above 5 Acres Only
Sampling Technique	Simple Random Sampling Method
Survey Instrument	Structured Questionnaire

Sources of Data Collection:-

4.1. PRIMARY DATA:

- Primary data is collected through Structured Questionnaire for Farmers who cultivate pomegranate. The questions will be so designed to fulfill the objectives of the study.
- Interviews of the agricultural officer & other officers in government agencies
- Observation made by the researcher while collecting the data from farmers.

4.2. SECONDARY DATA:

Secondary data required for analysis & collected from various sources like annual reports of agricultural department, journals related to the topic, magazines, periodicals, various internet websites related to the topic.

- **INTERVIEWS** I have used the interview method for the study. I have taken the interview of farmers & agricultural officers. I have taken interview of 100 farmers and 2 agricultural officers. Farmers interviewed were selected by the sampling method.
- **SAMPLING:** For satisfactory results it is very necessary that researcher have to select right size. To find right sample size selection of right sampling method should be correct.

4.3. SELECTION OF DISTRICT:

In the Maharashtra state, Ahmednagar is one of the leading district in the cultivation pomegranate. Secondly Ahmednagar district comes under the arid region of the scarcity zone. For the same the land of Ahmednagar district is suitable for pomegranate cultivation. Hence, Ahmednagar district was purposively selected.

4.4. SELECTION FOR TEHSILS:

The primary unit of the sample was tehsils of Ahmednagar districts. The leading tehsils of pomegranate cultivation in Ahmednagar district are Sangamner, Akole, Rahuri, Kopargaon Rahata and shrigonda out of which Sangamner & Akole were selected purposively.

4.5. SELECTION OF VILLAGES:

The secondary unit of the sample was villages. Ten villages from each tehsils having maximum area under pomegranate cultivation were selected for the study.

4.6. SELECTION OF SAMPLE/ FARMERS:

From each village 5 farmers who cultivate pomegranate were selected randomly. Thus, total sample size for the research were 100. Sample size: - 100

5. DATA ANALYSIS & INTERPRETATION:

Que. No. 1) Do you cultivate pomegranate in your farm.

Sr. No.	Particulars	No of respondents	Percentage
1	Yes	100	100
2	No	0	0

(Reference: Questionnaire)

The above table shows that all farmers to whom question was ask cultivate pomegranate.
Que. No. 2) why do you cultivate pomegranate in your farm?

Sr. No.	Particulars	No of respondents
1	Suitable for un irrigated land	80
2	Earned maximum profit vis a vis cost requirement	65
3	Less water required	85
4	Availability of government subsidy	90
5	Possible to export	50

(Reference: Questionnaire)

Above table shows that 80 of farmers cultivate pomegranate as it is suitable for un irrigated land,65 cultivate as it earned maximum profit vis a vis cost requirement,85 cultivate as it required less water, 90cultivate because of availability of government scheme .

Que. No. 3) Do you think pomegranate cultivation has positive impact on farmer’s economic upliftment.

Sr. No.	Particulars	No of respondents	Percentage
1	Yes	84	84
2	No	16	16

(Reference: Questionnaire)

Above table shows that all farmers were agree that pomegranate cultivation has positive impact on farmers economic upliftment.

Que. No. 4) if yes, then what is the impact of pomegranate cultivation on farmer’s economic upliftment?

Sr. No.	Particulars	Before pomegranate cultivation	After pomegranate cultivation	No. of Respondents
1	Condition of House	Not Good	Well constructed	80
2	2 wheeler/4 wheeler	No	Yes	90
3	Own Agricultural equipment	No	Yes	70
4	Children Education	Primary School	CBSE school	75
5	Bank Balance	No	Yes	70
6	Festival expenses	Less	More	85
7	Expenses on Ornaments	Less	More	80

(Reference: Questionnaire)

Above table shows that, 80% of farmers agree that they have well constructed house after pomegranate cultivation; 90 % agree that they purchase 2 wheeler /4 wheeler after pomegranate cultivation;70% agree that they purchase their own agricultural equipment after pomegranate cultivation. So from above graph we can say that pomegranate cultivation has a positive impact on economic upliftment of farmers.

6. MAJOR FINDINGS:

- Ahmednagar district as Sangamner & Akole talukas comes under rain scarcity region. Majority of farmers agree that pomegranate cultivation has a positive impact on farmer’s economic upliftment.
- Most of farmers happy to cultivate pomegranate as its gives more profit with respect to cost involvement.
- Pomegranate Cultivation is increasing as farmers can cultivate pomegranate in un irrigated land, also water requirement is less for pomegranate cultivation.
- Pomegranate Cultivation is increasing due to the subsidy provided by government.

- Pomegranate Cultivation is increasing in Sangamner & Akole talukas though the availability of water is less in this area.

6.1. SUGGESTIONS:

- The quick and efficient means of transport facility should be established in these areas, so farmers can use it to transport their pomegranate in market.
- Cold storage facilities should be provided by government which will help farmers to store their pomegranate.
- Expenditure on plant protection, diseases, and cracking of fruits are the burning issues in front of farmers. Governments' agencies have to do something to solve these problems.
- Majority of the farmers in this area do not have knowledge about cultivation of pomegranate, but they want to cultivate pomegranate within their farm for them training programme should be implemented by governments agencies.

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Extended Marketing Mix in Private Hospitals: A Literature Review

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Abstract: *A common reform used to increase consumer choice and competition in public services has been to allow private providers to compete with public incumbents. However, there remains a concern that not all consumers are able to benefit equally from wider choice. We consider the various available research papers. Whereas reforms in the 2000s enabled privately owned hospitals to enter the market. We show that, post-reform, poor and ethnic minority patients were much less likely to choose private hospitals; and that dominant drivers of sorting between public and private providers are health based criteria for treatment by private providers and the geographic distribution of hospitals. Counterfactual simulations suggest differences in health explanation of the difference in the use of private providers between rich and poor patients. patient preferences, physician referral patterns - are accounted for. Although much of the observed sorting does not appear to be the result of market frictions. Researcher focus on the extended marketing mix while doing the literature review for the same.*

Key Words: *Patient choice, demand for healthcare, healthcare reform.*

1. INTRODUCTION:

Literature review is of prime importance in any research work. Literature review is a kind of spadework through which the researcher prepares the part of his research work. Literature review gives insight to go deep in to the query of the area of research. The researcher not only comes to know about the research work done beforehand but also becomes aware of latest trends and developments done on the topic. The paper attempts to critically analyze the research paper and presented the work carried out related to healthcare marketing.

2. REVIEW OF LITERATURE:

Agnes Jarlier and Suzane Charvet-Protat have published their paper ‘Can improving quality decrease hospital costs?’ in ‘International journal for Quality in Health Care 2000’, Volume 12, Number 2, pp. 125-131. Health costs are escalating in the western world. The concept of cost of quality is used to quantify costs. It was originated in the 1950s in the USA with implementation of the first quality control programs in industry and comprises the cost of preventive failure, performing quality controls and rectifying internal and external failures. The researchers have chosen 448 articles, which were retrieved electronically, and 106 manually but the true number of articles was fewer because of redundant information among data basis. As health economist, they did not try using other key words. Several non-selected articles proved interesting but the objectives and methods were not explicit enough to judge the true value of information they contained. Only 12 articles met his strict selection criteria. Results on savings and improved quality of care need to be judged in terms of how long program listed, how large it was, the type of institution where it was implemented, and what resources were allocated. Prevention costs per patient varied little whereas treatment costs decreased considerably but without explanation, during the last two quarters of the study. Program size varied according to context, aims and available means. It was found that,

- When organization is poor, there are costs for rectifying failure, or hidden costs, which often do not appear in the account books.

- The most detailed study used a flow chart to describe the steps involved in preparing and administering an antibiotic in order to rectify all real costs.
- The literature search focused on studies that analyzed relationships between quality of care and costs.
- An Important aspect insufficiently discussed in the studies that met our selection criteria was whether the positive results observed during the study period would persist over time.
- A further shortcoming is the frequent absence of statistical analysis.
- They must not be taken out of context, and have to be interpreted with care and supported by further studies using more methods that are rigorous.
- In essence, they emphasize the need for well-designed quality protocols in the future, especially if the aim is to reduce failures and decrease costs.
- They are not always told whether a discount rate is applied to enable cost comparisons over different period.
- Many factors like patients' individual risk of infection, site of infection type of health establishment and organization of care have to be taken in to account in prevention plans and in an analysis of their costs.

The literature review identified studies in adverse events of which concerned adverse drug events.

Ana Claudia Guedes and Tomasz Dyrda have published their paper 'Service and Site Co-operation Private hospitals as a Possible Response to Emerging Economic and Medical Issues' in 'Professional Study-2002 ENSP,

Rennes, France'. Over the last two decades, health policy in Europe has become increasingly concerned with the problem of growing costs of care. Most European Countries have responded with a series of measures to control these cost pressures. The fast development of biomedical technologies however creates every day new diagnostic and therapeutic approaches that tend to improve the patient's healthcare. No reasonable financial limit can be defined as sufficient to fully satisfy what we could call "populations' demands for health services". People always want "more" and "better", no matter if cars, clothes or health services are concerned. With the limited financial resources, the aims of reforms are to provide healthcare that is oriented. A growing perception is that there are some more cost-effective methods of hospital care and hospital management than current ones provided wildly.

The researchers found that:

- It is essential to start saying that we are all conscious with the fact that we are working in a scenario where all the resources are limited and the needs are bigger or superior.
- In fact, the most important thing we should give priority to in health area is the most fairly and efficient association process of resources between the state and the market, between private and public management.
- It is also between the monopoly and competition by balancing the failures market's negative incidence and the state's failures too.
- It is essential in the health sector to separate services from goods.
- Services guaranteed by the state cannot be directly provided by healthcare centers.
- Improving private hospitals can be fundamental to improve quality and cost efficiency of public services.
- Improvement of all private sector is done through their expertise and capacity of services.
- We are talking not only about an organizational model but also about a model that explores all the private sectors' creative capacity, commercialization and management.

In this model, the private sector has to shape the mechanism and the necessary resources to provide the services according to the previous established levels.

Anne Mills, Ruairi Brugha, Kara Hanson & Barbara Mcpake have published their paper 'What can be done about the private health sector in low-income countries' in Bulletin of the World health organization 2002, 80(4)'. In recent years, there has been a considerable growth of interest in the activities of providers in the private health sector in low-income countries. Policy-makers might best capitalize on the accessibility and popularity of this sector. However, the evidence is limited as to which methods work best. There have been many references to social marketing, accreditation, franchising and contracting, but much of the experience is documented only in the unpublished literature or has been gained in relatively small projects. The aim of the present paper is to consider how the activities of the private health sector in low-income countries can be influenced so that they help to meet national health objectives. The researchers found that:

- A lot of experience has been gained on how to work with private providers in low-income countries in order to improve their performance.
- However, very little information is available on influencing consumer behavior and restructuring health market.
- Although we have identified some successful efforts to influence private providers, they can be problematic.
- These efforts refer to sanctioned treatment practices that are contrary to current policy and there may be strong opposition from powerful professional groups.
- The monitoring function is vital but difficult to sustain in the long term.
- Successful projects are largely resource oriented, especially when they involve working with unorganized individual providers.
- Consequently, careful judgments have to be made concerning the relative return on investment in improving private sector activities as opposed to (Briggs CJ, 2006) investment in a strengthened public sector.
- Organized formal private sectors function better than unorganized ones.
- Fake doctors and units give poor services to patients.

Briggs CJ, Garner P have published their paper 'Strategies for Primary Health Services in Middle and Low-income Countries at the point of delivery' in the Cochrane library 2006, issue third. In many low and middle-income countries, government health services are often organized through a set of vertical programs. Each is responsible for organizing a set of inputs and ensuring they are delivered to address a specific health problem, such as tuberculosis, malaria, or deaths during childbirth. Healthcare is a complex product, and a quality service depends on parts of the service becoming functionally specialized to contribute to the total complex output. Specialized, separate, vertical program allows central technical supervision to 'reach out' through self-contained vertical program. The advantage with this approach is that it is thought to assure delivery. The disadvantage is that it could lead to service duplication, inefficiency and service fragmentation. WHO and others promote integration as a solution to these problems. The researchers found that:

TABLE I. There is a wide variety of strategies possible to attempt to achieve integration, and the various settings within which it could be applied.

TABLE II. No generalized message for the effectiveness of strategies to promote integration in primary healthcare has emerged from research.

TABLE III. Reproductive health is a popular area for studies on integration, but evidence is still inconclusive.

TABLE IV. Governments can only develop or implement policies if they have evidence to support them.

TABLE V. So, in the absence of clear evidence that integration is a better form of healthcare delivery, the way to deliver primary healthcare should remain a choice made by governments and NGOs based on logical, common-sense decisions within budgetary and resource constraints.

TABLE VI. However, people should be aware that integration might not improve service delivery, and establish mechanisms to monitor and evaluate.

TABLE VII. They decide to proceed with integration within a particular setting.

TABLE VIII. They anticipated a variety of outcomes reflecting the variety of setting to which integrative strategies could be applied.

TABLE IX. Use a cluster randomized design, possibly matching service providers by size of unit.

Choose appropriate control groups, matching baseline measures.

(Walshe) Internationally, health systems are facing a number of common challenges relating to demographic changes, the changing epidemiology of disease, developments in science and technology, increasing medical demand and rising public expectations. These pressures on health systems are producing some convergence in objectives and activities, including cost containment, health promotion, and expansion of access, primary healthcare, patient choice and collaborative working between health sectors. In terms of the international transfer of knowledge and expertise, countries borrow ideas from one another and adapt them to their own national needs and settings. However, due to the absence of a universal economic, organizational, cultural or political framework, we are still far from developing a common model of analysis

that can incorporate all the international structural and procedural variations in healthcare systems. The researchers found that:

- Health services trade has brought mixed benefits
- There is a clear role for policy measures to mitigate adverse consequences and facilitate gains.
- The priorities in policy terms are measures to address the loss of professional expertise from some areas, increasing investment in the health sector.
- Promoting links between private and public health services to ensure equity.
- There is a need for improved research to assess the magnitude and implications of the cross border trade in care.
- The interaction between the quality movement and organizational culture and structure vary from one context to another.
- The way in which a health system is organized interacts with the quality management movement and may produce unexpected effects.
- It is difficult to transfer quality systems to different contexts.

(Chaha, 2013) In a developing country like India, the role of rural healthcare units assumes a great significance in providing economical health services to the vast majority of the poor, malnourished, disease prone population. It was with this avowed mission of servicing; guiding, treating and nursing this and other segments that government health centers were set up in India. This paper has tried to analyze the rural health services from composite services angle with the help of scientific tools and has framed strategies. Of the questionnaires, 344 completed questionnaires representing 85% of respondents were selected for analysis. Based on the survey and other available information covered in the study pertaining to rural health services, the following observations emerge in common in the three rural health centers. Relevant quantitative information has been associated with the concerned observations. The researcher found that:

- In an age of information technology, the benefits of technological innovation should also be made available to rural areas.
- About 36% of the patient viewed, that majority of the health personnel are very casual in coming to their duties.
- The rural healthcare units should have clear sense of their target market and customization approach to serve the customer needs.
- Healthcare provider should be totally committed to their goals and should consider all pros and cons of its service performance.
- The best service providers should set high service quality standards by giving patients excellent medical facilities and competent and efficient staff.
- Excellent managed health units believe that staff relation will reflect on customer relation.
- To promote healthcare facilities in rural area, the public health center play a commanding role.
- The research results reveal that the satisfactory variables perceived by patients do not provide high degree of satisfaction in the four previously mentioned factors.
- The enhancement in the degree of patient satisfaction requires effective development and improvement in the healthcare service quality and this demands financial resources.
- The control function would help in assessing the performance and identifying the positive and negative contributions of personnel and technologies used in the process.

(S.K.Mishra) According to industry analysts, any hospital with a minimum capacity of 100 beds in a potential IT buyer. It is estimated that there are over 1,000 hospitals in that category in the country. National Association of Software manufacturers providing services believes that healthcare organization in India will use IT for 100 million non-residential Indians in the current year. The major component of this will be hospital management systems and networking hardware required for processes like telemedicine. Even with such a small scale of operations, some significant changes are being made nationwide that will strengthen telemedicine initiatives and the healthcare industry as a whole. The most important initiative is the standardization of exchange of health information between different entities within the healthcare sector. The ministry of communication and information technology is jointly creating a national health information infrastructure, for easy capture and dissemination of health information. The researcher found that:

- Healthcare provider organizations adopt E-health services in India gradually.

- The growth of E-health services has given rise to the need for a new breed of healthcare professionals, healthcare administrators and healthcare technologists.
- Historically the healthcare industry has been the last adopter of technology; the same has been the case with healthcare education.
- Even until today, many of the medical, dental, nursing, pharmacology and other healthcare degrees do not have courses on information technology.
- The industry has grown to such a size that people from non-healthcare backgrounds are being recruited and trained.
- Interestingly, many youngsters with traditional healthcare degrees such as MBBS and BDS are exploring career options in E-health.
- Some forward thinking companies such as Medvarsity have started offering healthcare courses to healthcare students and practitioners.
- It is helping medical students to prepare for higher studies through online courses.
- It also has courses directed to both students and practitioners.
- The industry has grown to such a size that people from non-healthcare backgrounds are being recruited and trained.

(Dr. Sunil Gupta, 2014). India spends about 6.5 to 7% of GDP on healthcare, out of which, 22% in the government sector and 78% in the private sector. It is estimated that healthcare market is touching one lakh crore per annum, and is expected to grow at more than 15% per annum. National level of spending on healthcare under Five Year Plans has decreased. It was 3.3% in first plan and 0.75 in eighth plans. This paper is presenting introspection on present health insurance system and prospect of health insurance in India. It considers how to change the Indian healthcare system and life of millions of Indians. Present growing market offers a large unexplored market for private insurance companies and offers new products to millions of middle class Indians. A high expense in healthcare makes many poor families to remain below the poverty line and their whole life income is consumed in a single major surgery or treatment. The researchers found that:

- Health insurance is an emerging important financial tool in meeting health care needs of the people of India.
- India model of health insurance is viable because of different standard of living and earning capacity in different parts of the country. All different forms need to be explored, and insurance companies can cater need of different segment of population by offering them insurance scheme that could serve them according to their need.
- The truth is that health financing cannot be dealt separately as it has to do with good governance, economic growth, and education.
- Availability of authorized product will suppress use of spare hours and copycat drugs.
- Currently availability of medicine is only up to 40% of population. It can be increased by enabling the public to purchase from assistance of insurance reimbursement.
- Current government initiative to build rural roads can help companies to create their distribution system in inaccessible areas.
- Each hospital should participate in national healthcare program as a part of social responsibility.
- Each hospital should use full capacity because of huge market size.
- Identify India's specific diseases and investing in their R&D because return is insured via insurance.
- Investing and collaborating with government for building infrastructure for new technology development.

Edith Patouillard, In recent years, there has been increasing interest in the role played by the private sector in providing health services in low-and middle-income countries. Many countries have a vibrant and growing private sector, which is perceived by some to respond to the failures of the public sector to provide affordable, accessible, convenient and high quality services. Private providers, in contrast, are argued to deliver services that are more convenient, more affordable and more responsive to the needs and preferences of users. The private sector is also an important source of care for poor and disadvantaged groups within low and middle-income countries. There has been little investigation, however, of the extent to which such interventions can be successful in expanding access to those who are difficult to reach and to provide services that are "genuinely pro-poor". The researchers found that:

- There was strong evidence of the effectiveness of social marketing interventions in terms of improved access to affordable and quality products for recipient populations.
- The Kinet project was implemented in Kilombero and Ulanga districts of Southern Tanzania.

- Net coverage was also found to be significantly greater in areas with longer access to socially marketed insecticide treated nets.
- Coverage of ever-treated nets was associated with 27% reduction in the risk of post-neonatal child death between 1997 and 1999 and prevented in 20 post neo-natal child deaths in 1999.
- The Zambian vouchers project was implemented in the urban district of Kalulushi during a week mass measles vaccination campaign in June 2003.
- Net household coverage was observed to have increased from 50.7% prior to the campaign to 76.2% after the campaign.
- The clear seven social marketing projects were implemented in 1999 in the Jinja, Luweero and Mbarara rural districts and in two divisions of the capital city Kampala.
- Poorer groups also benefited in relative terms in urban Zambia, where the equity ratio was found to have increased from 0.66 to 1.19 with no statistically significant association between wealth and ownership found post-intervention.

Fusun F. Gonul, This article is the first attempt at an exploratory study on the effects of a widely used competitive marketing practice in the prescription drug industry: personal detailing to physicians and dispensing free samples by pharmaceutical companies' sales representatives. The authors investigate whether pricing and promotional activities influence prescription choice behavior using a comprehensive panel of physicians and data on competitive price and promotional activities or not. The authors find that physicians are characterized by limited price sensitivity. The detailing and samples affect physicians with a relatively large number of Medicare and health maintenance organization patients are less influenced by promotion than other physicians are. The researchers found that:

- The significance of public policy issues in the pharmaceutical industry cannot be overstated.
- The interests of care taking institutions and pharmaceutical companies alike give priority to prescription drug treatment over costly inpatient care.
- In addition, physicians are limited in their choice of prescription drugs through necessary agreements that lower cost.
- They have investigated the role and impact of personal selling on the choice of prescription drugs.
- The effectiveness of dispensing free samples to physicians follows the same pattern.
- They find evidence of the informative value of personal selling, which makes physicians aware of new drug alternatives and their specifics and prices.
- They find that pharmaceutical manufacturers may be wasting resources when sending sales representatives to physicians whose patients carry mostly Medicare or health maintenance organization coverage, because detailing and free samples are not very effective for such physician.
- They conclude that the impact of detailing and samples is limited and mostly informative.
- They suggest that funding ways to synchronize personal selling to physicians with direct-to-consumer advertising may achieve further gain, but the social benefits of such public drug advertising and its possible ramifications should be explored in depth.

3. CONCLUSION:

Marketing is a function by which a marketer plans, promotes, and delivers goods and services to the customers. In the services marketing, the providers are supposed to influence and satisfy the users. When people buy services offered by a service provider in a true sense, they buy the time, knowledge, skill or resources. Marketing the service is meant marketing something intangible. It is like marketing a promise. The applications of marketing principles in the services sector are the main things in the services marketing. It is the managerial process of managing the service.

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A Study of Augmented Reality for Data Booth

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Abstract: nowadays. as a way to obtain information about that product user pick pamphlets or leaflets or obtain the information with the aid of salesclerk. although, to receiving such product records on pc or any device, users ought to use lots of mouse and keyboard actions over and over, that's wastage of time and inconvenience. this may reduce the amount of time to gather unique information concerning the specific product. user is likewise not able to determine its internal dimensions thru pictures. those dimensions may be anticipated by means of the use of three-D movement tracking of human actions and augmented fact. based totally on three-D motion tracking of human movements and augmented fact application, we introduce a singular kind of interplay. in the proposed machine, the principle purpose is to demonstrate that with higher interaction capabilities in showrooms as well as on-line buying ought to improve income through demonstrating the buying object extra wider. with the assist of the our assignment the patron can be able to view his alternatives on screen according to him and thereby can make better choices. in this paper, we proposed hand gesture detection and reputation approach to locate hand moves, after which through the hand gestures, manage commands are sent to the device that permit user to retrieve data and get entry to from records kiosk for better buy selection.

Keywords: 3-d movement monitoring, augmented reality, hand gestures, records kiosk.

1. INTRODUCTION:

The growth in era is proving beneficial to the arena. with the improvements of computer and internet generation, e-commerce and on line shopping have rapidly stepped forward, because of the convenience that they provide purchasers. the general public have their opinion that, e-commerce and on-line shopping cannot provide the entire description, specifically for products like apparel, shoes, rings, furniture, and so on. for many such products, onsite purchasing has many wonderful benefits over on line shopping. still, there is lots of improvement in generation. augmented truth is the collection of statistics from special resources, makes use of a cameras, cell devices, and stay give up users, developing a multi-dimensional, interactive virtual surroundings which is actual time this is overlaid on actual world stay imagery. the facts required comes from all viable resources such as, which is not restrained to social, geographic, audio, video, picture, and from specific computational sources like cell, computer and so forth. now, with the capacity to depend on computational gadgets like computer systems, cellular or any device to arrange all this data, customers can effortlessly spend more time interpreting, designing, and accessing with that facts. it effortlessly permits them to revel in era via improvements like augmented fact. augmented truth (ar), an upcoming human-computer interaction technology, that goals to combine the laptop generated 2nd or three-D virtual objects with real global pix, has advanced the purchasing over net. in comparison to digital reality, that modifications the actual world, ar replaces bodily fact by combining digital gadgets into physical international. augmented fact for records kiosk that visually places digital products into actual physical environments for user interaction. this trending approach provides clients with a threat to "strive" a product at domestic or in any other use surroundings. the aggregate of augmented reality with hand gesture had made the device work in a more interactive manner. operating the product involves rotation (left, proper), navigation over the product by way of the use of the hand gesture of the patron .the patron can view the product from all the instructions in step with the selection made. this could reduce the efforts of the patron to apply the keyboard operations for this reason making the commercial of the product in a more interactive manner.

2. PROPOSED DEVICE:

We proposed system in which customers which can be willing to shop for any product are predicted to be computer users with minimum computer expertise. but, the user interface of the gadget is made quite simple and consumer-pleasant to the patron. in step with our device, we decided that costumer purchasing generally includes 3 important duties:

- I. From the facts kiosk looking for products.
- II. Running and interacting with statistics kiosk.
- III. Obtaining product information from facts kiosk.

The user interface is designed to facilitate the above three purchasing responsibilities. those responsibilities are mixed into menu gadget because the augmented truth window .via these menu, users can get admission to full description that is designed for augmented fact.

Thru the webcam, hand gesture is recognized, product related to that is decided on from a properly-built facts kiosk. product from the database is loaded on the display screen and the customers can select one of digital products from all and manipulate it, user can flow or rotate the version, and additionally see the internal view of the product and think about all specific data about that product, along with product call, it's charge, size of it, and plenty of factor that assist to patron make their buying decision in greater reliable way.

3. STRUCTURE OF MACHINE

We had proposed a machine consists of hand detection and reputation and the data is retrieved from the database as highlighted in figure 1. every consumer can effortlessly use machine, manage the machine, view the previous and subsequent product and obtains all statistics concerning that product. before everything user get right of entry to application gui. person just need to apply hand to access the system in the display sector, and while consumer use hand gesture to pick the one-of-a-kind options and the device acquires the data from database. after getting access to all statistics from the database, the specified data is visible on the screen or the display.

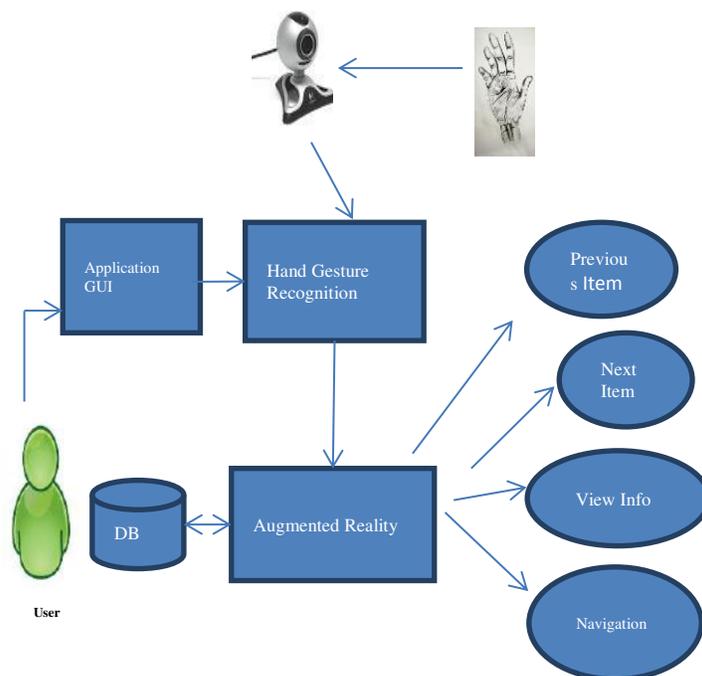


Figure 1. Machine structure

Discern 2 suggests gadget flow of our proposed device. in the beginning, the hand gesture movement is captured via webcam as video feed. from the video feed, frames are captured and send for processing. in processing all captured photographs are blurred for higher detection and from these pics all are converted into hsv coloration model for acquiring accurate coloration. next, thresholding for changing picture into binary shape (black and white picture) and the blob detection from pix are completed. from these blobs, gesture is recognized. the remaining step is preprocessing the recognized gestures and according to that gesture command associated with that is ship to gadget after which records regarding to product which user needs is then retrieved from database. when user chooses any choice thru hand moves, and from these alternative ,the device gets all facts and in the end displayed on the display screen.

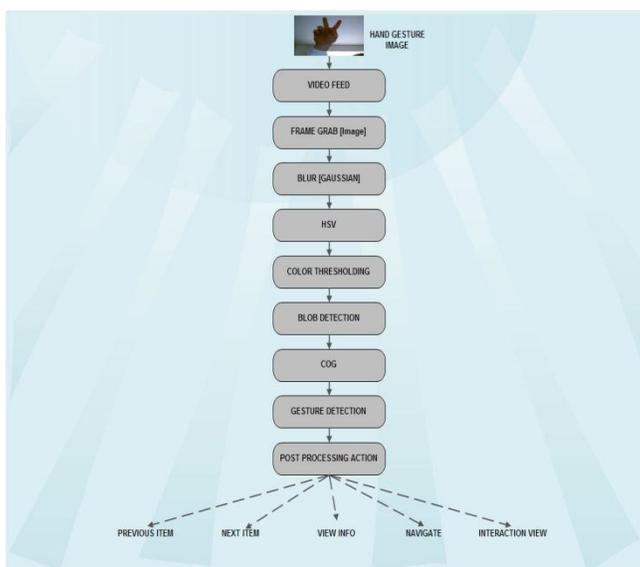


Figure 2. System waft

4. PHOTO POPULARITY

This section will describe the element of hand gesture detection and recognition technique. parent 2 is the hand gesture popularity flow chart. first, the pics snatch from the video feed is exceeded via unique operations consisting of photograph blur, thresholding, rgb to hsv, blob detection and hand gesture reputation. ultimately we are able to examine ,stumble on and apprehend the hand gesture. now we will talk hand gesture detection and popularity in short separately.

4.1 blur an image

While web camera grasp an pix of person gestures, all pictures get blurred to lessen polishing results. by using lowering sprucing effects we get extra correct detection. we cut up all rgb fee separately and calculate the rgb common of surrounding pixels and assign this common fee to it. repeat this above step for every pixel and finally we get blurred photos of hand gestures. the flow steps of blurring an image are as follows.

steps 1 traverse through complete enter image array.

steps 2 examine each single pixel coloration value (24-bit).

steps three cut up the coloration fee into individual r, g and b eight-bit values.

steps 4 calculate the rgb common of all surrounding pixels and assign this average cost to it.

steps 5 repeat the above step for every pixel.

steps 6 save the brand new cost at same area in output picture.

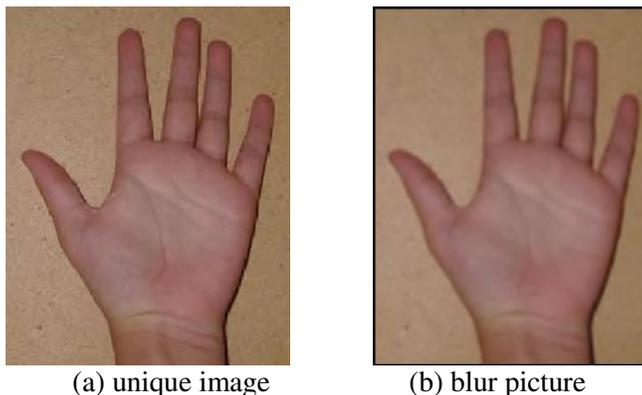


figure : 3.blur an image

4.2 RGB to HSV (grayscale) conversion:

After blurring all images ,all blurred snap shots are transferred into hsv (hue, saturation, price) model. hsv is more potent version than rgb as it offers a greater intuitive illustration of the relationship among hues. hsv selects greater particular color.

in hsv version price of 'h' and 's' remain steady if the cost of 'v' modifications, however value of rgb adjustments with the change in 'v'. so we get real shade price. discern 4(a) suggests input picture, four(b) saturated picture, 4(c) represent fee via which we get grayscale photograph. the float steps for conversion of rgb to grayscale photograph are as follows :

steps 1 first of all all of the pics are stored in array. traverse thru entire input photograph array.
steps 2 examine every unmarried pixel color cost (24-bit).
steps 3 calculate the grayscale thing (8-bit) for given r, g and b pixels using a conversion method.
$$\text{grayscale} = (r + g + b) / \text{three};$$

steps 4 compose a 24-bit pixel value from 8-bit grayscale cost.
steps five store the brand new fee at equal place in output photograph.

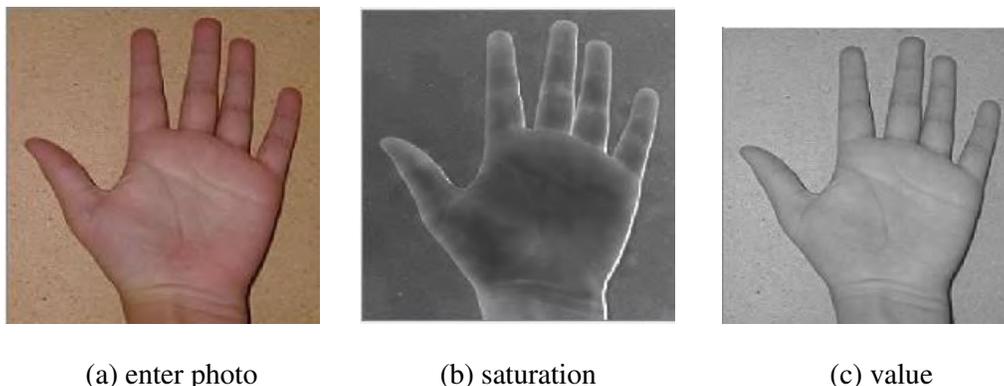


Figure four. RGB to HSV conversion

4.3 Photo Thresholding

For recognizing hand gesture we use thresholding. picture segmentation can be effortlessly executed by using the only technique i.e. thresholding. from a grayscale image, we use thresholding technique that can be used to create binary pics i.e. photograph which have only 2 colorings, black or white. it is usually used for gesture extraction where required gesture from an picture are transformed to white and the whole thing else to black (or vice-versa).the waft steps for grayscale image thresholding are as follows :

steps 1 traverse via whole input photograph array.
steps 2 read person pixel color cost (24-bit) and convert it into grayscale.
steps three calculate the binary output pixel fee (black or white) based on modern-day threshold.
steps 4 store the new value at same region in output picture.

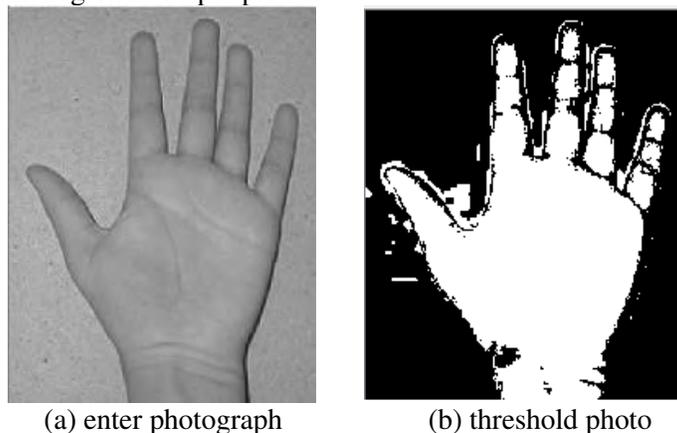


Figure 5. Image Thresholding

4.4. Blob Detection

Upon getting binary photograph inside the shape of most effective black and white, we get white blob and relaxation black (vice versa), we must should discover those blobs. for detecting blob first of all, begins from the first line of the picture and find corporations of one or more white (or black) pixels. organization of 1 or more white pixels are referred to as as lineblobs. discover x, y co-ordinates of each those blob .range each of these companies. repeat this collection on next line. even as you are collecting the lineblobs, check whether the lineblobs that checked before this present day line and spot if these blobs overlap each other. if so, you merge these lineblobs by way of the usage of there x and y co-ordinates to one blob it's going to treat as an entire blob. repeat this for each line and you've got a group of blobs.

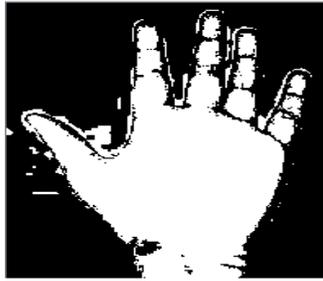


figure 6. blob detection

4.5 Gesture Recognition

The gesture-recognition module tracks the shifting hand features through using photo subtraction, identifies the motion, and determine which menu is issued. then the diagnosed gesture is then ship to the software getting used which is stumble on which menu is selected and what response is associated to that menu, which then communicates with the augmented truth.

5. CONCLUSIONS AND FUTURE WORK:

This paper implements a system that gives simpler way to retrieve information from an statistics kiosk. this device presents a consumer pleasant interface which could interactively get hold of statistics with the aid of hand gestures. as destiny paintings, growing the hand gesture reputation accuracy rate and boost the total pace of procedure is the primary initiative, so that the processing time required may be much less. including new hand gesture by person can also help the users to operate the display display with ease. we can offer greater interactive centers of facts retrieval and allow customers experience convenient. hence, it's far tested that with better interplay capabilities in showrooms in addition to on-line purchasing may want to improve sales by way of demonstrating the shopping item more wider. with the assist of our mission the customer might be able to view his selections on display screen in keeping with him and thereby can make higher choices. this undertaking may be improved further through enforcing it in on line buying. augmented fact (ar), an rising human-pc interaction generation, which objectives to combine or overlap computer generated second or 3-D digital gadgets and different remarks with actual international scenes, suggests great capacity for enhancing e-commerce structures. the brand new method gives customers a chance to "try" a product at home or in some other use surroundings. in destiny this can be a higher choice for commercial purpose in malls, multiplexes.

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Study of Indian Telecom Industry after Entering Jio

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Abstract: *In the today's competitive world communication plays a very important role. Communication have become an Integral part of the growth, success and efficiency of any business. This is the technology that gives a person the power to communicate anytime, anywhere. Due to advancement in technology, now communication becomes easy and faster. India's telecom sector has shown massive upsurge in the recent years in all respects of industrial growth. From the status of state monopoly with very limited growth, it has grown in to the level of an industry. Telephone, whether fixed landline or mobile, is an essential necessity for the people of India. This changing phase was possible with the economic development that followed the process of structuring the economy in the capitalistic pattern. The stupendous growth of the telecommunication companies in India over the last fifteen years can be attributed to the liberal government of India, economic policy. Telecom industry is under severe competition where number of players are using different marketing strategies to attract and retain the customers. In the age of digital technology, this war is producing benefits to the customers. The present study tends to produce the impact of launching of JIO in the Indian Market on the customers and other market players.*

Key Words: *Telecom, Key Players, Competitors, Mobile, Growth*

1. INTRODUCTION:

In June 2010, Reliance Industries (RIL) bought a 96% stake in Infotel Broadband Services Limited (IBSL) for ₹4,800 crore (US\$750 million). Although unlisted, IBSL was the only company that won broadband spectrum in all 22 circles in India in the 4G auction that took place earlier that year. Later continuing as RIL's telecom subsidiary, Infotel Broadband Services Limited was renamed as Reliance Jio Infocomm Limited (RJIL) in January 2013.

Commercial launch

The company commercially launched its services on 5 September 2016. Within the first month of commercial operations; Jio announced that it had acquired 16 million subscribers. This is the fastest ramp-up by any mobile network operator anywhere in the world Jio crossed 50 million subscriber mark in 83 days since its launch subsequently crossing 100 million subscribers on 22 February 2017. By October 2017 it had about 130 million subscribers.

In the year 2003 Reliance India Mobile was launched, which released the barriers of high cost outgoing calls, while made the incoming calls free and also introduced a low-cost-entry point of mobile for every Indian. Almost after about one and a half decades, Jio, backed by Mukesh Ambani, brought sensation in Indian telecom industry. Reliance JIO is being broadcasted as one of the world's largest start-up, with an initial investment of around Rs.1.5 Lakh crore. Reliance strengthened its passive infrastructure which is the key and the reason that it can compete with well-established telecom players and offer high-speed of data and voice calls. The company had launched its marketable services from September 05, 2016, with very attractive offers which included free voice calls for lifetime and roaming services for its customers along with lowest ever data charges at about one-tenth of the prevailing rates, reversing a few well set trends of the Indian telecom industry. The telecom sector is all set to witness a lot of thrilling in the coming months with the other operators trying new and innovative policies to retain their market share. The JIO is certain to put pressure on its competitors with solution to key issue of call-drops and other network quality issues. According to TRAI data, the total number of

broadband subscribers in the country at the end of October 2016 was 218.42 million. Of this, access through mobile devices or dongles accounted for nearly 200 million. At the same time, almost 75% of telecom companies' revenue comes from voice calls. Following Reliance Jio's announcement of a tariff war, other telecom operators like Airtel, Vodafone, Idea and Idea Cellular rushed to match its offers. Consequently, the revenues have fallen. While the offers have benefitted from the sharp drop in prices, the profitability of the telecom sector has been hit badly. After disrupting the industry with its free services, Reliance Jio has kept up the pressure with its competitive data tariff plans, starting 1 April 2017. Jio has also made all voice calls: local, STD and roaming completely free. The stock market has rewarded Reliance Industries for its aggressive entry into the telecom sector, and the RIL stock jumped more than 13% in a week. Reliance Jio's subscriber base has now crossed 10 crores. The question now is: How many of these subscribers will become paying customers? Most analysts put the number around five crores

2. OBJECTIVES OF THE STUDY

- To study Scenario of Indian Telecom Industry before Entry of Reliance Jio.
- To Study entering Strategy of Reliance Jio.
- To Assess Counter Strategy against Reliance Jio by other Competitor.

3. METHODOLOGY:

This study is carried out by using primary and secondary data. Primary data is collected through company outlets, retail shops of telecom service providers. The secondary data has been collected from desk research through library, Published Journals and World Wide Web. This study focus on study of Indian Telecom industry after entering Jio.

Scenario of Indian Telecom Industry before Entry of Reliance Jio:-

The year 2016 is a landmark year in the Indian telecoms industry. The much awaited sector consolidation set-in. Some of the key drivers for market consolidation include increasing pressure on profitability, hyper-competition, spectrum trading and sharing guidelines and favorable M&A policy. In addition, the sector also witnessed a number of spectrum trading and sharing deals. In August 2016, spectrum auction took place with the largest quantum of spectrum being made available by the Government of India. However, the auctions witnessed muted response, primarily on account of high reserve prices. Of the 2,355 megahertz (MHz) total spectrum across seven bands put up for auction, only 40% of the spectrum got sold with no activity seen in 700MHz and 900MHz band. Telecom operators bid selectively to plug coverage gaps and enhance spectrum portfolio, especially for 4G services. In another significant development, 2016 saw the entry of a Greenfield 4G operator, introducing aggressive tariff plans, with free voice calls and low-cost data. It is expected to usher in exponential growth in data. Leading operators have launched 4G services in select circles, which would further boost data growth. The Indian telecoms sector has traditionally been voice driven. Commoditizing voice calls and offering tiered data tariffs would shift the business model from a voice to a data centric one. India is already one of the largest smartphone markets in the world in terms of volume. According to Ovum, India's smartphone penetration stood at 24% of total connections in 2015. The average handset price for smartphones has been declining, with an entry-level 4G Smartphone available for INR 2,999. Prices are expected to further reduce helping drive data usage. The average data consumption per user is increasing, with increased adoption of smartphones and availability of content. For example, 3G data consumption per user has grown to 753 MB/month in 2015 as compared to 338 MB/month in 2011. The overall network traffic growth is expected to mirror the increases in average data consumed on a handset as more people start using advanced data services. The overall data traffic grew by 50% in 2015, driven by an 85% surge in 3G data traffic, according to the Nokia Mobile Broadband Index. Mobile banking transactions are on the rise due to increased smartphone adoption. Between FY13 and FY16, mobile banking transaction volume and transaction value have increased at a CAGR of 90% and 306%, respectively. This reflects that wireless smart devices are becoming a preferred medium for banking transactions. In addition, the digital payments ecosystem is growing by leaps and bounds in India. This is largely possible as India is transitioning to a digital economy. Digital wallets witnessed exponential growth in the back of the recent demonetization drive by the Government of India. The proportion of mobile wallet transaction volume to total payment transactions has increased from 0.4% in FY13 to 4% in FY16, and is expected to grow significantly in future. Further, with the launch of Payments Bank by a leading operator in 2016, financial inclusion for the unbanked would get a major boost.

Entering Strategy of the Reliance Jio

Reliance jio benefits:

Reliance Jio, brought revolution over the Internet speed and phone usage by giving their users Unlimited 4G Data, Unlimited Calls and Unlimited SMS at launching stage. Reliance Jio has purchased various Frequency Spectrum Bands on which 4G operates e.g. 2300 MHz, 1800 MHz and the most valued 850MHz (The lesser the numbers, more is the coverage area) ,any 4G LTE phone that supports the above mentioned Reliance Jio frequencies that will work with JIO SIM.. In the traditional networks viz. Airtel, Vodafone (Hutchison Essar), Idea, Aircel etc. the call is done via 2G Network, however in Reliance Jio, VoLTE technology has been used(*which is Voice Over Long-Term Evolution*) used to transmit calls over LTE network. This helps to get connected with Full-HD call with video-call with must faster connection than the earlier modes of communication. But to use the Jio services, you must have a VOLTE enabled Smartphone. Reliance Jio has also made VOLTE technology available to the LTE Phone users via Jio Join Android App, which can be used to Receive/Make Calls and send/receive SMSes.

MARKETING STRATEGY OF RELIANCE JIO : Reliance Jio is 4G only The Reliance Jio network is running entirely on 4G. To access the network, you need a 4G compatible phone with VoLTE support. Reliance Retail's lineup of Lyf phones offer a low cost option, starting from Rs. 2,999, though you can buy any phone that supports VoLTE and use it. You are not ready to move away from your current phone, you can buy the JioFi portable Wi-Fi hotspot at Rs. 1,999 and take advantage of Jio's plans as long as your phone supports Wi-Fi. 100 Percent VoLTE Reliance Jio is also a 100 percent VoLTE network - the largest in the world, according to Ambani. VoLTE stands for Voice over LTE, by which you make voice calls over the data network. As an end user, nothing is really different - you still dial a number just like you always would, and during the preview offer at least, connections have been clear and reliable. But at the backend, even voice calls use data, compared to non-VoLTE networks, that treat data and voice differently. Everything is free although Reliance Jio plans were revealed, everything is going to be completely free for users until March 31, 2017. Jio's data, voice, and video along with the full bouquet of applications and content will be available fully free for everyone. Ambani called this Jio's New year Offer, which will enable everyone to try out Jio without spending any money. This will also allow users to get comfortable with the various applications that Jio is offering, and Jio will use this period to test interconnections with other operators and to get feedback from customers. Coverage Jio's a new network, but its reach is already pretty wide - according to Ambani, the Reliance Jio network already covers 18,000 cities and towns, and over 2 lakh villages. Although it is already covering a large number of cities and villages, that doesn't mean that Jio's rollout has completed yet. It still has some ways to go to cover all of India, and the next target is to reach 90 percent of the population by March 2017, Ambani added. A million Wi-Fi hotspots Reliance Jio is now in the process of rolling out WiFi hotspots across India. By the middle of 2017, it plans to have 1 million Wi-Fi hotspots across the country, and it's offering Wi-Fi data in the 4G plans it offers; for example, if your plan is for 4GB, you get 8GB of Wi-Fi access as well, while the top 75GB plan gets 150GB of additional data via Wi-Fi hotspots. These hotspots are coming up at schools, colleges, and other public places. Free voice calls and roaming Highlighting how operators only charge for data while voice and messaging are essentially free, Ambani said that Jio will not charge for voice calls. "All voice calls for Jio customers will be absolutely free," he said, adding, "Across India. To any network. Always. And in the spirit of one India - no roaming charges also." This means that even if you're calling someone on another network - for which Reliance has to pay termination charges to the other network - it will pick up the tab. The cheapest data in India At the same time, describing data as oxygen, Ambani said that Reliance Jio's second principle is that data must be affordable. "Current market practice is to charge a base rate of Rs. 4,000 to Rs. 10,000 per GB of data," he said, "Jio will have a base rate which is more than a 90 percent discount over the industry."Reliance Jio is offering data plans at Rs. 50 per GB, though a look at the actual data prepaid plans shows that this isn't 100 percent accurate. On the cheapest plan, Reliance offers 4GB of data for Rs. 499 - still a great deal, but not exactly Rs. 50 per GB. However, Reliance is also giving 8GB of Wi-Fi access at Jio Wi-Fi hotspots, and unlimited usage at night, so it definitely works out to a very reasonable amount, and under that Rs. 50/ GB figure once you factor that in. Bundled entertainment services That's not all though - Reliance Jio is also going to give free access to its various Jio apps. The full bouquet includes Jio's video on demand service, its music streaming platform, and even a live TV service which allows you to view previously aired shows by scrolling back on the timeline. There's a lot on offer, but we don't know anything about how the pricing for these services will be structured, only that the full bouquet taken together will cost you Rs. 15,000 per year. However, these are going to be given fully free to all users until the end of 2017. e-KYC for fast sim activation Noting how inefficient the paper-based manual process to onboard customers is, Ambani noted that people had to wait for hours to get their service activated. In my experience getting Reliance Jio SIM cards activated with in a day. A customer with an Aadhaar card will be able to get the Jio sim with a working connection in 15 minutes. Jio Fibre Launch of this service is not yet announced but Jio is working on a fibreline network which will provide FTTH services to commercial & residential customers. Jio has planted their fibre across vast areas of India and planning to cover all over Indian region by 2018. This broadband will surely provide more data transfer speeds compared to the current FTTH ISP as they have their own single fibre line and are not dependant on any other ISP.

Counter Strategy Against Reliance Jio by other Competitor.

After Entry of Reliance Jio Following Impact are there from other Competitors or How Change other Competitors from his Plans.

Shares of Bharti Airtel, Idea Cellular and Reliance Communications saw their share prices dip further on Friday, after analysts slashed price targets on some of them, and warned that the launch of new rival Reliance Industries' Jio venture is set to be much more disruptive than earlier imagined. "Free voice is key to making Reliance Jio's integrated plans much more compelling cost-wise than those of peers," JPMorgan analyst Viju George said in a report. Reliance Chairman Mukesh Ambani took the wraps off the Jio network on Thursday by offering free calls and rock-bottom data prices that sent shares of established players into a nosedive on fears of an all-out price war. "RJio has disrupted industry pricing more than we imagined, with consequences for incumbents likely more difficult than we expected," said George, who trimmed his price target on Bharti Airtel to Rs 290 from Rs 335, and that on Idea Cellular to Rs 85 from Rs 100. Idea shares fell as much as 3.4 per cent today, after slumping 10.5 per cent yesterday. India's largest wireless player Airtel slid as much as 1.4 per cent at day's low today. The stock had slumped 6 per cent yesterday. "We have been concerned over Jio's launch for a couple of years, and the event is turning out to be as negative as we had feared," Credit Suisse analyst Sunil Tirumalai wrote in a note. Mr Tirumalai said he believed Jio's tariff structure, if it resonates with customers, could usher in the entry of bundled voice and data plans in the country. At 11:01 a.m., shares of Idea Cellular were down 2.5 per cent, Bharti Airtel were off 0.2 per cent while Reliance Communication declined 1 per cent. In comparison, Nifty50 index was flat.

1) Free Voice & 4G Data from Operators by Jio Effect

In this blog post, we are sharing all offers launched by other Indian networks by the effect of Reliance Jio. Like Vodafone is offering double 4G data, Aircel is offering free voice calling for 90 days for Delhi customers at Rs. 148, BSNL is soon going to introduce unlimited voice calling plan exactly same as Jio at just Rs. 149. Previously we have shared Jio effect on another operator by Welcome Offer, and now **Jio effect** is moving towards Jio happy new year offer.

2) Vodafone Double 4G Data Plans & Offers

Vodafone Double Data Offers on 4G Recharges			
4G Data Price	4G Plan Benefit	Extra 4G Data	Validity
255	1GB	1GB	28 days
459	3GB	3GB	28 days
559	4GB	4GB	28 days
999	10GB	10GB	28 days
1999	20GB	20GB	28 days

Due to Jio Effect, Vodafone has now doubled their 4G data for plans starting from 255 Rs. This offer is valid for both old and new Vodafone prepaid customers. Although it is the effect of Reliance Jio 4G still Apoorva Mehrotra, Business Head of Vodafone Delhi / NCR said that we got a good response to Vodafone SuperNet4G and henceforth introducing double data to all 4G customers. On comparing Rs. 999 plan, you will get 20 GB of 4G Internet data which is same as Rs. 50 per 1 GB data offer by Reliance Jio which is yet to become commercial after March 2017, but until then you can enjoy free data of 1 GB per day via Jio new year offer.

3) Get 9 GB free with 1 GB Vodafone Data on New 4G Phone

This plan is exactly similar to the Airtel Free 4G data offer where the user needs to do 4G recharge for 1 GB plan from there new 4G enabled mobile handset, and they will get additional 9 GB free 4G data. Same is the case with Vodafone where you will Now get 9GB of FREE data on your new 4G Smartphone for as many as 3 months.

4) HOW TO GET FREE VODAFONE 4G SIM UPGRADE?

Looks like Vodafone is stalking Airtel with its plans and offerings, and this time is the case with free 4G sim upgrade. Yes, you can upgrade your 3G SIM to 4G absolutely free of cost. Just visit any Vodafone Store and ask for 4G upgrade.

5) Upgrade to Vodafone 4G SIM & Get Free 2 GB Data

Now once you upgrade from 3G to 4G SIM that too free of cost, Vodafone will greet you with free 2 GB of 4G internet data to make you aware of internet experience with Vodafone SuperNet4G. This offer is applicable only for existing Vodafone customers with a 4G phone in select locations.

6) Reliance Jio Effect on AirTel 4G Plans & Offers

Due to Jio Effect, Airtel has launched many offers and plans to hold their customers. We have created a detailed blog post for the same where we have listed all [Airtel free 4G data](#) offers which are currently active and how you can avail them. Offers include free 4G SIM upgrade, 10 GB 4G internet data at price of 1 GB, Free 1GB 4G data by giving missed call and many more offers listed in that blog post. So make sure to check out those before it gets expired.

7) Free Unlimited Airtel to Airtel Calls

Airtel has launched a plan with which you will get [unlimited free voice calling from Airtel](#) to Airtel mobile number whether it is Local or STD. This plan costs Rs. 145 and not only free calling but you will also get free 4G data with it. Apart from free voice calling, Airtel prepaid user will also get 300 MB of 4G Internet Data. Moreover if you do not have a smartphone and you are using a featured phone then you will get extra 50MB of internet data. This plan is valid for 28 days.

8) Free Unlimited Voice Calling from Airtel to Any Network

Another plan launched by Airtel is Rs. 345 plan under which prepaid users will be eligible to call freely to any network. Means you will get free calling from Airtel to any network provider in India. Secondly, you will get 1 GB of 4G Internet data and same 50 MB of additional data if you have featured phone. This plan is valid for 28 days.

9) Idea 4G SIM Upgrade & Get 2GB Free Data

Similar to Airtel & Vodafone, Idea also giving away free 4G SIM upgrade with free 2GB data offer for new 4G customers. Also, you can get 10GB internet data for Rs. 255 on upgrading to a 4G smartphone. Another great offer is that you can get 1GB 4G data for just Rs. 51 per month till 1 year after doing a 4G recharge of Rs. 1499 in which you will get 15 GB of 4G Internet data. This price may vary across circles, but this plan can be compared with [Reliance Jio 4G plans](#). After Jio Effect, Idea is running in the track of data war, and almost every operator like Airtel, Idea, Vodafone are running side by side with the same sets of plans.

10) Reliance Jio Effect on BSNL

Out of all other telecom operators, BSNL was the first and closest competitor to Reliance Jio with its internet plans and free voice calling offers. Not only in the mobile network but [BSNL launched unlimited broadband plans](#) to grab as many customers as they can in this telecom industry race. BSNL recently launched STV 498 plan as a promotional offer for winter holiday season, and this plan can be activated till 7th January 2017. This is an unlimited 3G data plan which is valid for both new & old users, and valid for 14 days as usual. An interesting fact is that there is no FUP limit on the 3G speed provided by BSNL that is there is no speed limit, and you will get maximum 3G speed.

11) BSNL to Launch Unlimited Voice Calling Plan

BSNL state-run operators are about to launch an unlimited voice calling offer which is exactly same as one of the Reliance Jio monthly plan. This plan is expected to be priced at Rs. 149 and with that, you will not only get free unlimited voice calling but also 300 MB of internet data. It is expected to be launched in January 2017. BSNL Chairman, Anupam Shrivastava admitted that 'Jio has come up with disruptive strategy and we are ready to match whatever tariff is being offered by our competitors'.

12) Aircel Offering Free Voice Calling for Delhi Users

With Aircel new combo voucher of Rs. 148 you will get free voice calling for 3 months. Free calling includes all on net calls free and all off-net Calls free (15000 seconds capping/month) for 30 & 60 days respectively. Post expiry you will be charged 30 paise per minute for all local and STD calls. Moreover, you will get unlimited Data (FUP of 500 MB) for 28 days. This offer is valid only for Delhi subscribers. Remember that you need to have at least Rs. 50 in your account balance.

13) Aircel launches unlimited voice calling packs

Aircel has now launched unlimited free voice calling plans for their subscribers across India. The plans are RC14 & RC249 applicable for both existing and new prepaid customers. Price of the packs may vary according to different circles. RC14 Plan worth Rs. 14 offers unlimited free Local & National calls to any network in India for 1 day. RC249 Plan worth Rs. 249 offers unlimited free Local & National calls to any network in India for 28 days. Moreover, you will also get unlimited 2G internet data valid for 28 days.

14) Tata Docomo Free Internet Data & Free Calling for Postpaid Users

Tata Docomo also came into the race with free 1500 minutes voice calling and 2GB of Internet data for their postpaid customers. They are calling it as 'Simple is the Best' combo plan which is priced Rs. 299 for postpaid customers. This plan comes with 1500 minutes of free voice calling for local & national calls. That is it for now, but we will add more plans and

offers which came after the Jio effect in this blog post. Hope this post helped you to earn free 4G internet data for your desired telecom company.

15) Other Competitors Change Following Prepaid & Postpaid Plans

Prepaid Offers-

Telecom Operator	Data Offered	Validity (days)	Cost in Rupees
Reliance Jio	1 GB 4G per day	84	399
Vodafone	1 GB 4G per day	70	244
Idea	1 GB 3G Per day	28	347
Airtel	1 GB 4G per day	84	293

➤ Bharti Airtel

Airtel has aRs 1495 plan that gives users 30GB of data for 3 months, effectively giving users 10GB of data at 500 rupees per month. A Jio Prime user in the same time frame will get 90GB of data for Rs 909. The only advantage that the Airtel offer has is the fact that Jio has a 1GB per day fair usage cap after which the speed gets reduced to 128kb/s while an Airtel customer can choose to use as much of their free data in one day. Airtel has also introduced two unlimited voice calling packs at Rs 145 and Rs 345. The former offers unlimited Airtel to Airtel voice calls along with 300MB of 4G data while the latter offers unlimited local/STD calls to all operators and 1GB of 4G data. Both plans have a validity of 28 days.

➤ Vodafone

Vodafone has a Rs 297 plan which gives a user 4GB of 3G data with a validity of 28 days. Similar to Airtel, Vodafone also offers two free voice calling plans. The first, at Rs 149 offers unlimited Vodafone to Vodafone voice calls along with 300MB of 4G data. The second, at Rs 349, offers unlimited local/STD calls to any operator along with a gigabyte of free 4G data. Both plans have a validity of 28 days.

➤ Idea Cellular

For Rs 297, Idea customers can get 3GB of data with a validity of 28 days. Idea also has two voice calling plans. The cheaper plan gives 300MB of 4G data along with unlimited Idea to Idea calls at Rs 149 while the more expensive plan offers 1GB of 4G data alongside unlimited local/STD calls to any operator at Rs 348.

➤ Reliance Jio

Jio has aRs 299 plan which offers 2GB of data per month along with unlimited local/STD voice calls and SMS with a validity of 21 days. If we go a step higher, Jio'sRs 499 plan offers 4GB of 4G data along with unlimited local/STD voice calls and SMS with a validity of 28 days. If we take Jio's Prime service into account, no other operator can even come close to offering a better deal for the price

➤ Verdict

If we include Jio's Prime service into account, no other operator can even come close to offering a better deal for the price. Only Airtel comes close with its Rs 1595/3 month's offer, which still offers 50GB less data per 90 days at a higher cost. However, for users getting a Jio SIM after 31st March 2017 and hence not having access to the Jio Prime service, the situation becomes a little bit more complicated. Let's compare this for what you will have to pay on Airtel, Idea and Vodafone for free voice calls and 3/4GB of free 4G data:

- **Airtel:** Rs 843/month (10GB 4G data + free local/STD calls to any operator)
- **Vodafone:** Rs 646/month (4GB 4G data + free local/STD calls to any operator)
- **Idea:** Rs 647/month (3GB 4G data + free local/STD calls to any operator)
- **Jio:** Rs 499/month (4GB 4G data + free local/STD calls to any operator)

Postpaid

All 4 operators, including Jio have introduced post paid plans which offer unlimited voice calling, free SMS along with 4G data in one package. Let's compare the base packs of all operators:

➤ Reliance Jio

Jio has a 499/month plan which offers 4GB of free 4G data, unlimited data between 2am to 3 am at night, free local/STD calls to any operator as well as unlimited SMS. However, as mentioned above, Prime subscribers can avail the Rs 303/month plan which will offer 1GB of 4G data per day till 31st March, 2018.

➤ Bharti Airtel

Airtel's Rs 549/month infinity plan offers 3G of free 4G data, free local/STD calls to any operator and 100 SMS/day. Airtel is also offering up to 10GB of additional free data at a nominal price of Rs 100 per month to its existing post paid users. This offer is only valid for a limited time however.

➤ **Vodafone**

Vodafone's RED 499 plan offers 3GB of 4G data, unlimited local/national SMS, free local/STD calls to any operator along with free national roaming incoming calls.

➤ **Idea Cellular**

Idea's Rs 499/month unlimited plan provides 3GB of 4G data, free local/STD calls to any operator along with 100 SMS/day. Jio has completely shaken up the market and pushed competitors like Airtel and Vodafone to dramatically lower their rates.

Conclusion:

Reliance Jio's entry generated lot of drastic and unanticipated changes in consumer's behaviors. Environment of telecom industry has changed drastically. Every player is striving for retain its market share. The company would have generated a significant market share in next 3-5 years. Company has created new benchmark of speed, price and competitiveness in the market. Reliance Jio has successfully hit the target market and has deep pockets to invest but has threat to competition and technology.

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A STUDY OF SUPPLY SIDE ISSUES LEADING TO SUSTANABILITY OF MUTUAL FUNDS

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Abstract: After the demonetization Indian economy has witnessed golden period for investment industry. The maximum benefit of the demonetization move was observed in Mutual funds. There is huge growth in mutual fund industry in terms of Asset Under management. Mutual fund investments has gone up by a whopping 196% to Rs 2.37 lakh crore in the one year period since the government's banknote demonetization move in November 2017. It is a steep hike of Rs 1.57 lakh crore during the period (November 2016-October 2017) compared to the corresponding period a year ago when the total investments amounted to Rs 80,000 crore only. All kinds of investments under the Mutual Funds umbrella received a boost. But the sustainability of it depends on the performance of mutual funds which is highly dependent on selection of the right schemes. Previous research had pointed out the reasons for slow growth of mutual funds in which most of the blame was given supply side and distribution pattern of mutual funds.

This paper deals with the problem identification in distribution of mutual funds. Survey of 150 mutual fund distributors and 16 AMC's was conducted in order to identify the loop holes in mechanism of mutual fund distribution

Key Words: Mutual fund, distribution, supply side issues

1. INTRODUCTION:

Mutual funds are one of the most successful financial innovations visible in recent investment matrix. It is a product which plays significant role for augmenting economic growth leading to financial betterment in every aspect of financial system investors, capital markets, and money markets. It is credited with all important functions of economic value addition.

Although, success stories of many developed economies such as US and Australia have crowned MFs to be one of the most flourishing investment vehicles to channelize savings into investment. “Mutual funds are very poorly penetrated in Indian market, less than 5% of Indians have invested in mutual funds compared to 80% in US. Mutual funds’ assets in India constitute less than 8% of GDP as compared to 105% in Australia and 77% in US.

Mutual fund offers the opportunity to earn high returns that exists in stock market without getting exposed to complete risk. It offers the goodness of all the investment products to the investors such as liquidity, diversification, safety, flexibility, tax saving, wealth creation, regular income, professional portfolio management, affordable and minimum threshold, systematic financial planning all under one roof called “Asset Management company or Mutual fund company” To increase their sustainability and identify the areas of improvement from supply side factors two categories of respondents AMC's and distributors (IFA's, Banks and National distributors) are considered.

Probable supply side factors:

1. Is there any fault in method adopted for fund selection by distributors?
2. What are the reasons for less popularity of mutual funds amongst individual according to distributors and AMC's?

2. REVIEW OF LITERATURE:

Nicola & Michele, (2001): Both Nicola and Barth focused their research on the supply side parameters at macro level, especially the features of the financial services sector, which may affect the size of the mutual fund Industry.

Nicola discovered the points like bank concentration, extent of the supply channels, barriers for entering securities business.

Barth et. al, (2001): Whereas, Barth suggested issues such as effortlessness of entry into the fund industry like cost of setting up a new fund, time required to set up a new fund and existence of government supported competitive financial products are noted for their contribution to the growth of the industry.

They considered only supply side concerns and that too at aggregate level which gives no clues regarding scattered distribution of MF within the country and also ignored demand side factors which can also have huge impact on Industry growth.

Rajeshwari TR and Rama Moorthy (2002): Studied the financial behavior and factors influencing fund selection of retail investors by conducting factor analysis using principal component analysis, to identify the investors fund selection criteria. The study was limited to 100 educated investors in urban and Semi-Urban cities only. They stated that in financial markets “expectations” of the investors play a vital role. They influence the price of the securities; the volume traded and determines quite a lot of things in actual practice. Even though MF is widely known to be a retail product intended to target small investors, salaried people and other who are frightened by the stock market but on the other hand, like to reap the benefits of stock market investment. It is also revealed that the investors are basically influenced by the fundamental qualities of the product followed by efficient fund management and general image of the fund in their selection of fund/schemes.

Black et al. (2002): Examined customers’ choice of financial services distribution channels. They listed down the following factors such as customer confidence, lifestyle factors, motivations and emotional responses which influence the customer's choice, also product channel and organizational factors such as image and reputation are also significant.

Lee and Marlowe (2003): tried to present a better understanding of how consumers choose their financial institution. Even though decision making style of individuals, may differ based on their experiences, socio-economic and demographic characteristics. They found that the most important criterion that individuals use in deciding on a financial institution is convenience in terms of location of office. Retail fees are the second most frequently reported decision-making criterion, followed by the array of services offered and the existing personal relationships.

It should be verified whether the same points acts as loophole from supply side of MF industry.

Ramamurthy and Reddy (2005): Carried out a study to explore recent trends in Indian mutual fund industry. Authors concluded that major benefits delivered to small investors by mutual funds are specialized management, diversification of investment; return prospective, convenient administration, liquidity, lucidity, affordability, elasticity, ample of choice and apt regulation. They also analyzed certain recent trends in the mutual fund industry such as, changes in entry and exit load, obligatory certification of mutual fund sales, shift from income funds to money market funds, from banks to mutual funds and online buying and selling of mutual funds.

Barber et al., (2005): Argued that the investment decisions of mutual fund investors are influenced by prominent, attention-grabbing information. Investors are more responsive to prominent information such as fees, commissions, than operating expenses; they are expected to buy funds that attract their attention through outstanding performance, marketing, or advertising. They observed consistently negative relations between fund flows and front-end load fees. A negative relation between fund flows and commissions charged by brokerage firms was also documented. In contrary, no relation was observed between operating expenses and fund flows. Further analyses discovered that in mutual fund advertising and promotion costs are often embedded in a fund’s operating expenses, account for this unexpected result.

This study showed that MFs growth depends upon information provided by MF companies which suggested the role of supply side issues in MFs growth (Penetration).

Zechner et al., (2011): Studied the crossing point between intermediaries and portfolio managers and investors. There are often several financial advisors between portfolio managers and investors. Portfolio managers pay significant “softener” to compensate advisors for price inequity or marketing. Their investigation of financial intermediaries comes to conclusion that Mutual fund distribution channels impact fund performance. Indirect channels distribute underperforming funds. Direct and indirect channels distribute actively managed funds with equal or higher performance than passive funds.

P. Maheshwari (2015): Asset Management Companies demand that restrictions on advertisements should be relaxed and the advertising guidelines should be simplified to enable better communication, but there should be some control over these advertisements by the SEBI and approval of the SEBI must be made mandatory. There are some sources to compare one’s track record with other competing products so that the investors can better understand the benefits of investing in mutual funds.

Channel of investment: It is observed that still only 11% of retail investors prefer to invest through direct channel and 89% depends on distributors.

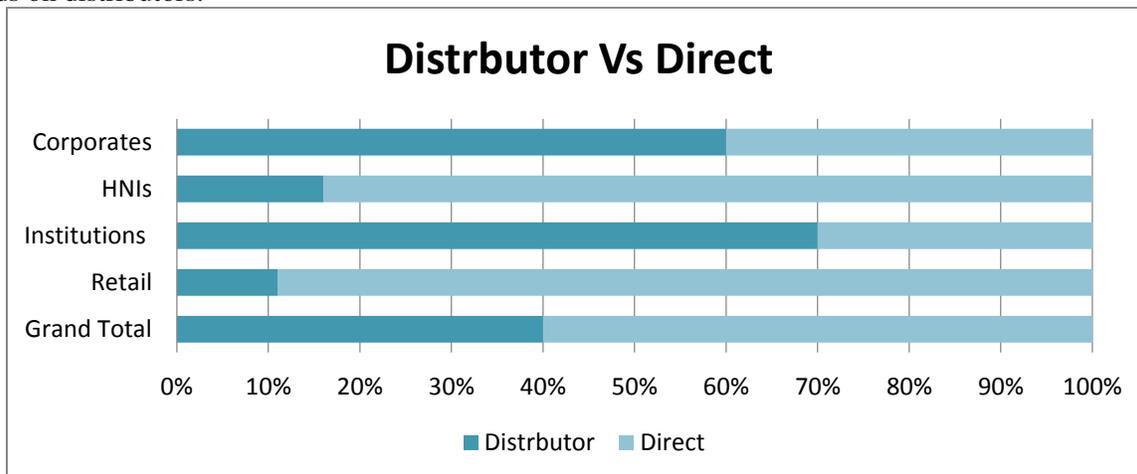


Figure no.1. : Channel of investment used by investors

3. OBJECTIVES:

- To study Method of fund selection by distributors of mutual funds
- To study the Opinion regarding factors responsible for less popularity of mutual funds
- To find out ways and means by which mutual fund companies can improve the distribution

Hypothesis No. 1: In ability to take risk is the most important factor responsible for less popularity of mutual funds.

- **Null Hypothesis:** All factors are equally responsible for less popularity of mutual funds
- **Alternative Hypothesis:** Risk averse investors is the most important factor responsible for less popularity of mutual funds

Analysis:

Table No .1. : Decision of scheme selection

Q.1. Who selects the scheme for investment						
Sr. No.	Investor		Distributor		Both	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
No	121	91.7	47	35.6	96	72.7
Yes	11	8.3	85	64.4	36	27.3
Total	132	100	132	100	132	100

Interpretation: 65% of distributors said that distributors select schemes for investors. Only 27% said both investor and distributor are involved in scheme selection.

Table No .2.: Information collected from investors

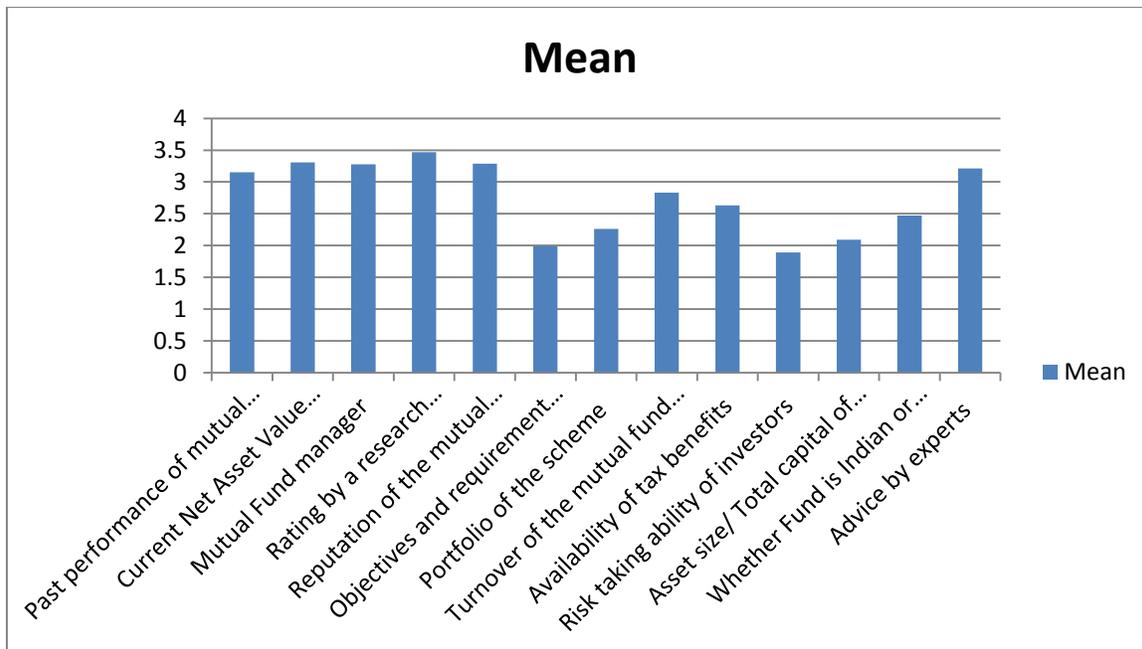
Q.2. What information you seek from investors before offering them any mutual fund schemes.								
Sr. No.	Investment objective		Financial Position		Previous Investment history		Their risk tolerance	
	Count	%	Count	%	Count	%	Count	%
No	40	30.3	78	59.1	78	59.1	80	60.6
Yes	92	69.7	54	40.9	54	40.9	52	39.4
Total	132	100	132	100	132	100	132	100

Interpretation: Most of the distributors considers investment objective of investors. While more than 60% of distributors don't consider financial position, risk tolerance and investment history before selecting scheme for investors

Table No .3. : Importance given various criteria for fund selection by distributors.

Sr. No	Criteria	Mean	Rank
Q3_1	Past performance of mutual fund	3.15	6
Q3_2	Current Net Asset Value (NAV) of mutual fund	3.31	2

Q3_3	Mutual Fund manager	3.28	4
Q3_4	Rating by a research agency/ Newspaper/ Magazine	3.47	1
Q3_5	Reputation of the mutual fund company	3.29	3
Q3_6	Objectives and requirement of investors	1.99	12
Q3_7	Portfolio of the scheme (% of investment in different co's)	2.26	10
Q3_8	Turnover of the mutual fund scheme(Sales during the period)	2.83	7
Q3_9	Availability of tax benefits	2.63	8
Q3_10	Risk taking ability of investors	1.89	13
Q3_11	Asset size/ Total capital of the mutual fund scheme	2.09	11
Q3_12	Whether Fund is Indian or Foreign	2.47	9
Q3_13	Advice by experts	3.21	5



Graph No. 2. : Importance given various criteria for fund selection by distributors.

Interpretation: It is observed that none of the above characteristics are given high importance by distributors while selecting for investors as none of them is rated above 3.47. In that rating by research agency and advice by experts are given moderate importance. And objectives and risk taking ability of investors are given least importance with the mean of 1.99 and 1.89 respectively.

Hypothesis No. 1: In ability to take risk is the most important factor responsible for less popularity of mutual funds

Null Hypothesis: All factors are equally responsible for less popularity of mutual funds **Alternative Hypothesis:** Risk averse investors is the most responsible for less popularity of mutual funds

To know which factors are responsible for less popularity of mutual funds amongst individual investors, 16 factors were considered and in all 132 respondents were asked to rate these factors on the scale of 0 to 10. Where 1 means least important and 10 most important factor, and zero if it is not at all important by their opinion.

Based on the importance given by the respondents the weighted averages of responses are obtained and then they are ranked according to their importance. The rank chart is shown in table below:

Table No. 4. : Ranking and means of factors responsible for less popularity of MFs.

Sr. no	Factors	Average	Rank
1.	Lack of complete information about mutual funds	6.6061	2
2.	Inability to provide good returns by the funds	3.8561	14
3.	Reluctance for change/ Cultural attitude towards investment and savings	6.0455	3
4.	Inability to take risk by investors	5.8030	5
5.	Mutual Funds Invests in stock market	6.9167	1
6.	Confusion in the minds of investors because of availability of number of schemes	5.7955	6

7.	Miss-selling by distributors/ banks/ mf companies is a major hindrance to further penetration.	5.8409	4
8.	Past performance of funds/ Past experience of investor	5.6136	7
9.	Other investment options are more attractive	1.7879	16
10.	Negative impact of advertisements/ Regulatory restriction on advertisement	2.6212	15
11.	Incentives or commission to the distributors is less	5.1364	8
12.	KYC / Paperwork / restrictions on cash transaction	4.6667	10
13.	Regulatory frame work of mutual funds in India	4.3637	12
14.	There is less accessibility to the investors	4.1137	13
15.	Mutual fund companies are not able to provide proper services to the investors	4.7955	9
16.	Information in Factsheets or offer documents is difficult to understand for common person	4.5303	11

Analysis: Observing table it can be seen that the most important factor why mutual fund is less popular is factor 5 – Mutual funds invests in stock market. Followed by lack of information about mutual funds and reluctance for change

Table No. 5: Results of ANOVA for hypothesis 1.

	ANOVA				
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3749.289	15	249.953	37.837	0
Within Groups	13839.698	2095	6.606		
Total	17588.987	2110			

Since p-value is less than 0.05 null hypotheses is rejected and alternate hypothesis “**All factors are not equally responsible for less popularity of mutual funds**” is accepted at 5% confidence interval.

Discussion: Further descriptive statistics shows that factor no. 5 **Mutual funds invest in stock market** is the most important reason for less popularity of mutual funds. It is having Mean **6.92** which is highest amongst all other factors enlisted. According to distributors majority of individuals believe that all the money in mutual funds is invested in stock market irrespective of the fact that there are many schemes which invests in debt sources as well. The knowledge about various mutual fund schemes is lacking in individuals. Negative mindset about stock market investment and its high correlation with mutual funds is the reason for less popularity of funds. Second most important factor is no. **1. Lack of complete information about mutual funds to the individuals having Mean 6.61**

Factor no. 7 is also found to be one of factors responsible for less popularity which is **Miss-selling by distributors/ banks/ mf companies** with Mean of 5.84. Table no. (From distributor’s side) . In open ended questions to distributors it was noticed that IFA’s don’t have sufficient knowledge about all the schemes of mutual funds. IFA’s said that people are reluctant to share their financial information because of which it becomes difficult to select proper scheme for them. Bank employees who don’t have core knowledge about mutual funds and not registered as distributor with AMFI are also allowed to sell mutual funds.

Factor No.9 “**Other investment options are more attractive**” is the least important factor as the Mean is **1.78** which is least amongst all the factors.

3. FINDINGS:

- Most of the distributors consider investment objective of investors. While more than 60% of distributors don’t consider financial position, risk tolerance and investment history before selecting scheme for investors
- It is observed that none of the characteristics enlisted for fund selection are given high importance by distributors while selecting for investors as none of them is rated above **3.47**.
- In that rating by research agency and advice by experts are given moderate importance. And objectives and risk taking ability of investors are given least importance with the mean of 1.99 and 1.89 respectively.
- When MFI’s were asked which features of mutual funds do they consider for scheme selection it was found that they have given high importance to characteristic number 13 i.e. advice by agent with mean of 4.51. Characteristic number 1, 2, and 3 which are past performance, current NAV and investment objective are given moderate importance with mean of near about 3. For all other enlisted characteristics very low importance is given.
- The MFI are just investing based on what is suggested by IFA’s. Past performance and current NAV are moderately considered while other features are given very low importance.
- AMC managers have rated factor number 3(reluctance for change),4(Inability to take risk),5(Negative mind-set about stock market),and 7(Miss-selling by distributors) as most important factors accountable for less popularity of Mutual funds, all the above mentioned factors possess weighted average mean more than 7 on the scale of 10.

Factor number 10(restrictions on advertisement), 13(regulatory framework) and 14(less accessibility to investors) are also held accountable having mean of more than 6.

- Distributors highlighted two factors for less popularity factor number 5 (Negative mind-set about stock market), and 1(Lack of information about mutual funds to investors).

4. RECOMMENDATIONS:

- Mutual fund is product which demands for proper analysis before opting for a scheme. Expected results can be achieved only if proper scheme is selected after gathering financial information of investor and analyzing it. Distributors should take utmost precautions by keeping himself updated and analyzing criteria for fund selection before offering the scheme to the investor.
- It is noted that not much efforts are taken from side of distributors to select suitable scheme for investors, also objectives and risk taking ability of investors should be given more importance which is not presently given by distributors MF companies should take care of this points and distributors should be trained accordingly, as dissatisfied investors may go for negative mouth publicity which may affect further penetration of mutual funds. This issue was also highlighted by MFNI from urban are when asked about reasons for not investing in mutual funds, one of the reasons mentioned was negative feedback by friends and relatives

5. CONCLUSION:

- Most of the MFI's select the funds as suggested by distributors and moderately consider past performance and NAV. The method adopted for fund selection adopted by most of the distributors is improper. Analysis showed that that none of the characteristics enlisted for fund selection are given high importance by distributors while selecting for investors. They moderately consider advice by experts and rating by research agency, and give least importance to objectives of investors and their risk taking ability.
- It can be concluded that mutual funds are less popular as investment option due to following factors :
 - Reluctance for change
 - Inability to take risk by individuals
 - Negative mindset about stock market
 - Miss-selling by distributors
 - Restrictions on advertisement
 - Unstable regulatory framework
 - Lack of information about mutual funds to investors.

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HOSPITAL INFORMATION SYSTEM-AN EXPLORATORY ANALYSIS

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Abstract: This paper aims at exploring the utility and effect of hospital information system on the hospital performance. The paper is based on the selected literature reviewed of major papers extracted for the study. On the basis of literature reviewed the researcher developed hypothesis and concluded that the Hospital information system has a linkage with the hospital performance.

Key words: Hospital Information System, Health Care, Hospital performance

1. INTRODUCTION:

Competition and advancement in health care industry pushing hospital to improve patient quality care by making appropriate quality decisions. Healthcare industry especially in the developed world is highly sophisticated, developed and characterized by rapidly increasing use of information technology in its every healthcare functions. To make healthcare affordable to the common people, it is become essential to explore opportunities to reduce cost and improve the decision making on the basis of processed information. The past research studies identified that hospital performance is an outcome of quality hospital information system. But it is also observed that study related to HIS differs from hospital to hospital.

World Health Organization (WHO, 2008) cautions that, the goal of a health information system is often narrowly defined as the production of good-quality data. The ultimate goal is to produce relevant information that health system stakeholders can use for making transparent and evidence-based decisions for health system interventions. Health information management system performance should therefore be measured not only on the quality of data produced, but on evidence of the continued use of data to improve health system performance, respond to emergent threats, and improve health (WHO, 2008). Improving health information systems in terms of data availability, quality and use often requires interventions that address a wide range of possible ‘determinants of performance’.

Health information systems recognizes that although new developments in technology, including the use of the internet and other modes of communication offer great potential in the flow of information amongst the providers and recipients regarding the provision and management of healthcare services, the selected hospitals sector remains far behind in taking advantage of such developments to improve reporting. Despite vast amounts of resources and time invested in the development and implementation of health information systems, health data is barely used by health workers for service delivery planning and decision-making. Performance is grossly under reported with developments to improve information management lagging behind other sectors improvement activities; the whole culture of information generation and use remain under-developed; and mechanisms for validating and assuring reliability are not optimally functional.

Reliable and timely health information is the important foundation of public health action, it is often unavailable. Due to which decision-makers cannot identify problems and needs, track progress, evaluate the impact of interventions and make evidence-based decisions on health policy, program design and resource allocation. Hence examining the utility of hospital information systems among hospital is essential.

1.1 Objectives of the study

To explore the Hospital management information system and its impact on hospitals

1.2 Methodology

The study is exploratory in nature. It is based on secondary data. The literature review of the selected papers taken. These papers were extracted from the reputed journals. The study analyzed the literature reviewed and formulated hypothesis.

1.3 Literature Review

The review of literature helps to understand the importance, background and present situation related to the subject selected for the research work; therefore it is necessary to review relevant and latest literature in relation to the subject matter. The following reliable, relevant papers are reviewed for the study.

Baroudi, J. J., M. H. Olson, and Ives B. (1986) studied the impact of Management Information systems on Health Management organization performance. The study observed the major benefits of MIS in building Competitive advantage in terms of better, faster, cheaper, or uniquely, when compared with rival firms in the market. The study also found that MIS report help to take decision and action on certain object with quick time.

Franz, Charles R. and Daniel Robey, (1986), Researcher has observed that, Many Health Management organization have managed their data and information manually with registers and hard-copy formats in Ahmednagar District.

Gable, G.G., Sedera, D., Chan, T.,(2003) revealed that aanalysis of and comparison of market trends helps organizations analyze the adequacy and quality of their strategic decisions with the help of MIS

Gurbaxani, Vijay and Mendelson, Haim, (1990) study found that implementing MIS is costly affairs which also includes employee training cost. Hence the study recommended that while implementing MIS company should weigh information systems cost against the potential benefits.

Hair J., Anderson R., Tatham R., and Black William, (1995), highlighted the importance of communication in gathering and distributing information, and information systems can make this process more efficient by allowing managers to communicate effectively.

Huh, Y.U. Keller, F.R., Redman, T.C., Watkins, A.R.,(1990) found that the hospital information system can calculate key indicators such as sales, costs and profits to help you determine which alternative gives the most beneficial result.

Iivari, J.,(2005) studied information system of Hospitals need for records of its activities for financial and regulatory purposes as well as for finding the causes of problems and taking corrective action. The information system stores information to prepare cost estimates and forecasts and to analyze how your actions affected the key company indicators.

Jiang ,J., Klein, G., and Carr, C. (2002),studied the Hospital as a system and justified that it is an integral part ofthe medical and social organization which is to provide for the population, complete health care, both curative and preventive; and whose services reach out into the family in its home environment.

Johnson, M.W., Hately, A., Miller, B.A., Orr, A(2007) done study on the hospital information system. In this study ,the author recorded that an open system has its ability to interact and transact with the outside systems and environment which mainly consists of interrelated components - Financial/Funding agencies, the community and the society, Government rules and regulations, and users of knowledge and skills generated by the hospital system.

Kahn, B.K., Strong, D.M., Wang, R.Y.(2002) justified that the need of an information system is an essential for the growth of the hospital. The author realized the need to analyze the hospital environment to identify the strengths and weakness to formulate the right hospital strategies.

On the basis of the aforesaid literature following hypothesis can be developed

1. There is no significant difference between the implementation of MIS and reduction in healthcare cost
2. There is a significant relationship between the implementation of the Hospital Information System and Hospital performance

1.4 CONCLUSION

On the basis of the reliable, relevant literature review, it seems that the Hospital Information system help in making quality healthcare decisions. It can also be concluded that there is relationship between the hospital performance and the quality of Hospital information system or it's level of implementation. The author finally developed hypothesis for the further study.

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ANALYSIS AND BUSINESS STRATEGY FOR ELECTRIC VEHICLE (EV)

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Abstract: Like any transformative innovative technology, electric vehicles create a variety of potent economic development challenges and opportunities. The EV is poised to reshape industry and community and no doubt it will be future of urban mobility. EV industry is evolving and lot of R&D is going to get major lead in this industry. This analysis reports puts forward and determines the several factors for sustainable business strategy for EV by doing External Environment Analysis using PESTEL and Porter's five forces and using Factor Analysis to map out opportunities and threat which effects company's direction as well as to locate potential sources of competitive advantage from a perspective that encompasses the internal, external, and dynamic fit of strategy.

This report gives the assessment of the crucial factors and its strategic impact of the moves of competitors and to maintain competitive advantage, understand the general drivers that create and sustain competitive advantage using Porter's Generic strategy, and to identify organizational barriers to change using Ansoff's Matrix and Value Chain Analysis. It also put forward analysis of market using segmentation, targeting and positioning based on conducted survey which shows the factors that has been carefully identified has a positive impact. Report also provides overview of distribution and suggests on omnichannel approach. This is aimed to use as an assessment and redesign of steps of current strategy and develop plans for effective implementation based on the factors identified to give firm a competitive advantage.

Maintaining a competitive advantage takes more than great timing or a single solution. Sustainable advantage requires a well-designed and well-executed strategy.

Key words: Business Strategy, Electric vehicle, Competition, VUCA environment.

1. INTRODUCTION:

EV industry is evolving and lot of R&D is going to get major lead in this industry. Gaining popularity of EV is making market more competitive and will be flooded with wide range of options from neighborhood car to high end SUV to commercial vehicles to buses to trucks. Competitive position of India poses great advantage of doing business in India. These are upward movement of Indians coupled with untapped rural market and fast developing urban market. Government focus on Make in India program and aggressive planning and policy making toward EV is certainly big opportunity to be tapped. Strategy is nothing but making sure we not only survive but prosper in VUCA environment and every step we take is to build competitive advantage. At the same time, we should keep in mind that we cannot sustain longer with single competitive advantage as it can be replicated by competitors one day or other, so need is to continuously keep reviewing strategy and build multiple strategies.

The top most principal factor the company need is long term vision and clear roadmap to capitalize on EV rapid growth. This can be set by asking basic questions such as who is our customer, who are competitors, how competitors will react to our movement, where we should be in next 5 years, and many more.

The focus is to identify the assorted opportunities and threat that exist in the external environment and building the strategy to tap these opportunities. Opportunities identified through PESTEL such as government opening tenders for EV vehicle, 2030 vision of 100% EV, car sharing and rental mindset shift, below average number of car per 1000 person,

charging network set-up and many more. Threat identified are EV as non-stream product, poor battery efficiency and its replacement, competition with global player etc. need to be converted to strength or risk to be mitigated. Early moves of tapping these opportunities along with risk conversion will certainly make many SME's to be in different ball game. Forces are going to get stronger with increase in number of players entering the EV industry and will be analyzed by the Porter's Five Forces. Early start with high product differentiation and focusing on niche marketing will certainly have an early movers advantage in many areas helps in gaining market share and dominate the market with continuous innovation. Various competitive strategy has been formulated using Porter's generic competitive strategy, blue ocean strategy, Ansoff Matrix, Value chain analysis. This framework will help the SMEs to continuously keep innovating and frame their product based market entry strategy.

Survey conducted using several factors shows that 78% respondent has shown interest in considering compact smart electric neighborhood vehicle. This shows there is willing and acceptance in such of EV.

2. NEED OF STUDY:

- To study significance and impact of various factors related to the EV and analysis the crucial strategic factor to build a competitive advantage around strategic factor.
- To study significance and impact on companies' sustainable position in the VUCA environment.
- It is beneficial to management of the company to understand market dynamics and have crystal clear picture regarding important aspects like external environment, competitive advantage, market analysis, buying behavior, segmentation, positioning, etc.
- To study the company business, competition and identify areas of strength and weakness.
- To presents detailed view about external environment, suggest competitive advantage to the management and how to gain sustainable competitive advantage over competitors.

3. OBJECTIVES:

Objective of the study is to identify the crucial strategic factors to build a competitive advantage around strategic factors and implement a sustainable competitive advantage in EV space through systematic developing business strategy in VUCA environment.

- Evaluate market opportunities & threats using PESTEL, Porter's 5 forces & SWOT & identify strategic factors.
- Evaluate the sustainability of competitive advantage through crucial strategic factor identified, Porter's Generic Strategy, Ansoff Matrix, and value chain analysis.
- To identify segments, their targeting and positing.

This report defines a strategy formulation process that can be applied to prepare marketing or operations or financial or another plan on daily, monthly, quarterly, yearly basis. It will help to gain a better understanding to SMEs of what should be doing and how it fits into overall company strategy and departmental activates.

4. METHODOLOGY:

The information is collected through primary and secondary sources during the project. That information was utilized for deciding on business strategy, calculating performance evaluation and based on that, interpretations were made. Group common activities are divided into four buckets, to clarify how activities fit together to formulate business strategy.

1. Industry Analysis		
<i>1.1 Environment Scanning (macro, economic, political, social, cultural, technological)</i>		
Internal	External	
<i>1.2 Competitive Environment</i>		
<i>1.3 Strategic Factors Decision</i>		
2. Competitive Strategies Analysis		
<i>Creating competitive advantage</i>		
Competitive positioning	Strategic alliances and networks	Superior service and customer relationships
Innovation	Omni channel marketing	
3. Market Analysis		
<i>Segmentation</i>	<i>Positioning</i>	<i>Targeting</i>

<i>Customer Acquisition</i>		
<i>Sales process</i>	<i>Campaign Planning</i>	<i>Marketing Plan</i>
4. Organizational Analysis (Self)		
<i>Financial</i>	<i>Quality Measures</i>	<i>Customer satisfaction</i>
<i>Marketing</i>	<i>Core competency and USP</i>	<i>Competitive advantage</i>

Industry Analysis: Overview of industry by scanning internal and external environment such as macro, economic, political, social, cultural and technological and deciding on strategic factors which impacts on the business performance.

Competitive Strategies Analysis: Creation of competitive advantage by positioning, strategic alliances, superior service, innovation, customer relationship, omni channel marketing.

Market Analysis: High level conceptualization of penetration of market, go to market strategy, customer acquisitions.

Organizational Analysis: Through analysis of organization through its customer satisfaction, competitive advantage, marketing, financials.

5. INDUSTRY ANALYSIS:

The foundation of any strategy is information and the analysis of the information. The information encompasses both the internal environment of the organization and the external environment facing the organization. The systematic gathering and analysis of information is a major task, but it will enable the organization to determine its direction with much more precision and understanding, and it becomes the foundation supporting the marketing strategy. Trends, influences, business conditions, resources, and capabilities must be explored for the present, past, and future.

1.1 EV INDUSTRY PROFILE

As per study conducted by Bloomberg New Energy Finance, Global demand for EVs is to surge to 54% of new car sales by 2040. They foresee big inflection point for the global auto industry in the second half of the 2020s. Selling prices for EVs will be comparable or lower than those for average ICE vehicles in almost all big markets by 2029. The mood the world over seems to be electric. EVs will make up the majority of new car sales worldwide by 2040, & account for 33% of all the light-duty vehicles on the road.

Though growing at a rapid rate, electric vehicles are still a niche rather than a mainstream product. Numerous challenges stand in the way of a flourishing EV market. Many of these are the result of macroeconomic conditions which not only have a profound effect on purchasing habits but also on the ability of governments to offer financial incentives and support investment in the necessary infrastructure.

Following is details about EV industry

Parameter	Current (2016)	Future
Market Size	3% in 2016 as per Accenture	15% by 2021
Major Geographical Distribution	China (Largest), US, Norway, Netherlands, Sweden, France, UK,	US, China, Germany, France, Sweden, UK, Canada, etc
Sales Volume	777497 as per Forbes	3 Mn by 2021 as per Bloomberg New Energy Finance 5.5 Mn by 2025 as per Jato Dynamics
Growth rate	CGAR of 19.2% in 2013 to 2019	CGAR of 37.63% by 2021 as per Research and Markets
Global Electric car stock	2 Mn vehicles	Between 9 to 20 Mn by 2020 Between 40 to 70 Mn by 2070
Composition of EV	2 wheelers, low speed (LSEVs), and buses.	Almost entire product line
Charging Infrastructure	Continuously growing public and private. Globally, public infrastructure was 72% higher than last year.	Continuously growing public and private. Many private players are investing in providing charging network. CAGR of 43.7% by 2021

The impact of autonomous driving is limited for the next 10 years, but ride hailing and car sharing services will have an impact sooner. Autonomous vehicles will be primarily shared and will begin to replace existing human-driven shared and

hailed cars starting in 2030. This will start to impact vehicle sales and increase the average distance travelled per vehicle. It is expecting that 80% of all autonomous vehicles in shared applications to be electric by 2040 due to lower operating costs.

1.2 INDIA COMPETITIVE POSITION

Following table describes India Competitive Position.

Advantage	Disadvantage
Raising domestic demand	Focus should be on high quality manufacturing
Automakers can easy rearrange factories for EV production	No track record of EV manufacturing, Battery manufacturing, etc.
Highly Skilled and English speaking workforce	Less government financing than countries like China
Focus is on R&D by major auto makers	Rising cost of labor and material
Existing supply chain	Intellectual property violation not taken much serious
Rural market untapped	EV guild lines not in place
Incentives for Make in India	Charging network not established
Guidelines to move full EV by 2040	Long hours of power cuts
Cost advantage driven exports	

1.3 ENVIRONMENT SCANNING

Environment scanning is the process of continually acquiring information on events occurring outside the organization to identify and interpret potential trends, opportunities and threats. It is important because environment is dynamic in nature, therefore scanning is necessary to keep abreast of changes. It reveals elements or factor which constitute of threat and opportunities to the overall objective of organization. Internal and external environment will be analyzed through following framework.

- PESTEL
- Potter’s five forces
- SWOT
- TOWS

1.4 PESTEL

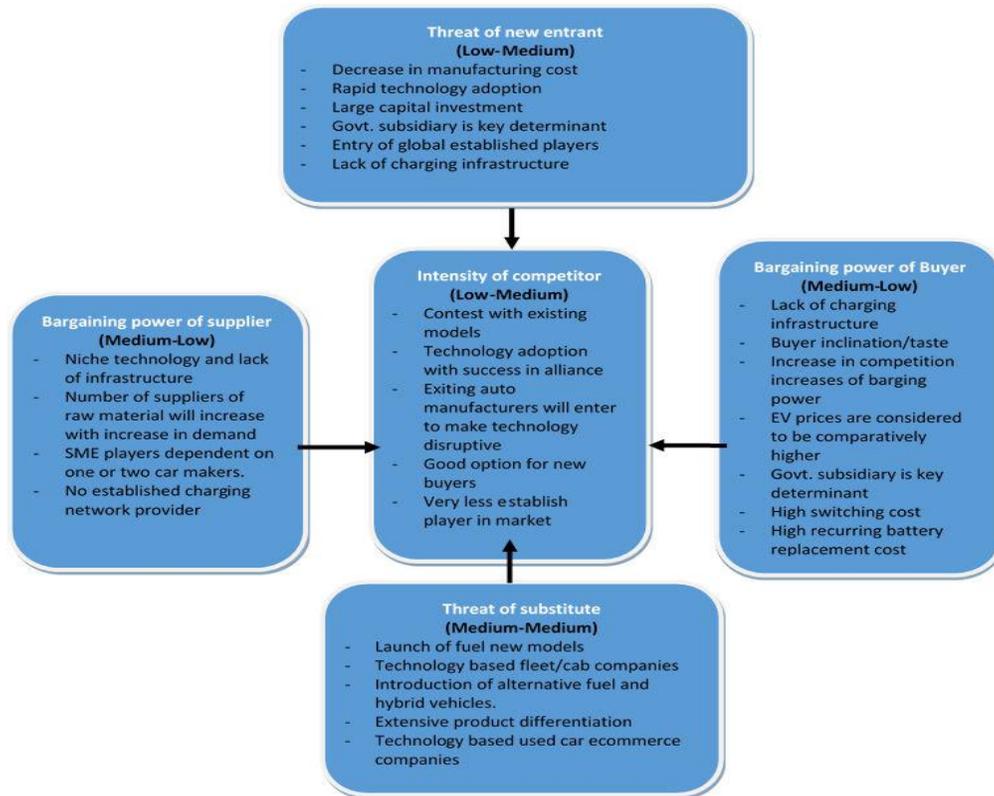


Suggestion and Recommendations: Factors like Make in India and increase in FDI inflow create huge opportunities for growing EV industry and companies should focus on enmeshing these by showcasing and leveraging technology which will help those companies to get global footprint.

EV business performance will get benefited from decreasing battery cost, decreasing renewable energy cost and which in turns translates into affordability of EV. Downward interest cycle will help company to funds its requirement with low cost. GST will help in reducing cascading of tax effects and tax rate is also kept low around 12%. Downturn in Indian IT and pressure on GDP indicates threat to EV sector. Low rate of cars per 1000 person is great opportunity to grab on coupled with increase in spending power of Indians and large young population. Changing rural market is also area which industry to keep watch on and rural specific products will provide substantial opportunity. However, changing mindsets of Indians in terms of ownership of car and shift to rentals and rides is opening area for fleet owners. Offering end to end solution to them can be seen as opportunity where high volume is involved. However, some inertia about charging and its network which is currently treat to EV.

India is emerging as manufacturing and R&D automobile hub provides considerable opportunity. With governments aggressive policy in favor of EV. As of now, there is no legal framework available around for EV which is painting ambiguous picture.

1.5 POTTER'S FIVE FORCES



Suggestion and Recommendations: The competitive environment of an EV automobile industry is attractive as there is less competition in the industry. However, forces are going to get stronger with increase in number of players entering the EV industry. Early start with high product differentiation and focusing on niche marketing will certainly have an early movers advantage in many areas helps in gaining market share and dominate the market with continuous innovation.

1.6 SWOT ANALYSIS

SWOT: that is, the Strengths of the organization, the Weaknesses of the organization, the Opportunities facing the organization and the Threats facing the organization.

External Opportunities	Strengths
Future of automobile is EV or some form of hybrid	Organization has to identify their Strength and its organization Specific.
Rapidly growing market for green vehicles at least for next 2/3+ years	
Big automobiles companies are in R&D phase to build	Weakness

their product	Organization has to identify their Weakness and its organization Specific.
Capture supply chain through auto component suppliers	
Electric vehicle manufacturer	External Threats
Outsourced product R&D	
Joint IP development with big automobiles	Rapidly Changing technology
Selling IP to gain advantage	Unavailability of charging infrastructure
Expanding to new region/going global	Not a mainstream product as of now
Foreign collaboration/JV and strategic tie-ups	Driver less cars
Govt. aggressive plans to move on EV	Lack of necessities for EV in India
Till now Indian contribution to EV space is very less	Limited efficient batteries and replacement requirements after certain years
Few available model (EV+Hybrid) & volume is also low	Global competitors entering market
Tightening emissions laws	Establish player (such as Mahindra) have vehicles in market
Car sharing services/fleet owners/Technology Cab companies	
Rent and Rides outlook	
Scope for Urban and Rural specific version of EV	
Charging network setup	
Auto rickshaw for city travel	
Participate in Make in India for global visibility	
Plan which can help to increase rate of cars per 1000 person	

1.7 STRATEGIC FACTORS

To identify strategic factors, we had detailed discussion with Mr. Satish Komaragiri, Co-Founder of Automotif Pvt. Ltd. who have built prototype of off road EV vehicle targeted for airports, goal courts, megacities, etc. and have future plans for going full product line EV company. According to him, below are various strategic factors which need to be watched out for the EV industry. Below is the list of crucial strategic factors based Kepner Tregoe method to be consider in forming the strategy according to us.

Factor Name	Internal / external	Priority	Weight (1-5)	Weighted Score
Purchase Price	Internal	7	4	28
Charging Stations	External	8	5	40
Policy Mechanism	External	7	3	21
Battery Performance	Internal	8	4	32
Fuel Charges	External	5	2	10
Shift towards Green Technology	External	6	3	18
Safety	Internal	7	4	28
Readiness to switch	External	8	4	32
Shift towards Rentals/Taxis	External	5	3	15
Awareness	Internal	6	3	18
Charging Time	Internal	8	4	32
Hybrid Model	Internal	6	4	24
Income	External	7	4	28
Driving Range	Internal	7	5	35
Consumer Education	External	5	3	15
	Total	100		376

As a part of the project, we will be carrying out, **Factor analysis** to reduce a large number of variables into fewer numbers of strategic factors which we think every company/SME needs consideration.

1.8 PORTER'S GENERIC COMPETITIVE STRATEGIES

Porter suggests that there are three directions an organization can pursue for developing generic business strategies with an assumption that an overall low-cost position. Your choice of which generic strategy to pursue underpins every other strategic decision you make, so it's worth spending time to get it right.

		Source of Competitive Advantage	
		Cost	Differentiation
Competitive Scope	Broad	Cost Leadership Company should not focus on this to gain competitive advantage because volume is EV low and it can't be sustained over period of time.	Differentiation Once volume of sale increases to a substantial level, then company can focus on this segment.
	Narrow	Cost Focus Initially company can use this strategy to get foothold or penetrate in market then switch fast to differentiation in focus.	Differentiation in focus Company should focus on this through product development having unique features and targeting particular segments.

Suggestion and Recommendation: As there are not many players in industry and everyone is trying out new things, company should develop product which have unique features such as replaceable battery, connected cars, smart phone connectivity through various sensors, key less entry through smart phone or biometric, theft protection etc. At the same time focus on narrow market through segmentation such as working professionals, housewives, Sr. citizens, rural market. Here we are suggesting focus differentiation strategy. Company should not go for cost leadership strategy to gain competitive advantage because as volume of demand of EV is low and it can't be sustained over the period of time when larger and global player enters into market. However, to get foothold or to penetrate to gain market share, company to use Cost Focus strategy initially and then swift to differentiation in focus strategy. Here, company can implement feedback and customer issues faced in Cost Focus phase. Continuously keep innovating to keep brand differentiated from others. Here company need to focus on adding new products continuously at the same time improving existing products and increasing product line width and depth with outside in approach. Once desired level of volume of sales is achieved than Differentiation strategy need to applied. In differentiation, focus is on building brand value, pricing, omni channel marketing, international expansion, multination manufacturing, JV, outsourced R&D, etc. things to be implemented as an when opportunities are sensed and which in turn built competitive advantage.

1.9 ANSOFF GROWTH MATRIX

The purpose behind proposing the Ansoff Growth Matrix is to help businesses frame their product-based market entry strategies. One of the main purposes of using Ansoff Growth Matrix by a firm is to mitigate its product positioning and market entry-based risks. Four different types of strategies can be adopted by a firm based on the classification of the products and the markets.

		Product and Service	
		Existing	New
Markets	Existing	Market development - Developing pan India network of distributors and service centers. - Launch one by one product instead of all at a time. - Take special care of Culture, preferences while launching products	Diversification Do not focus as of now on this.
	New		

Existing	Market Penetration <ul style="list-style-type: none"> - Product demonstration in malls, multiplex, SEZ. - Focus on marketing and develop marketing plan to encourage more people to choose our product. - Introduce referral scheme - Introduction finance option and discounts or cashback or free accessories to attract customers - Focus on marketing team and set targets to achieve growth 	Product Development <ul style="list-style-type: none"> - Consider introduction of compact, small cars into market - Create value by registering patents and IP creation.

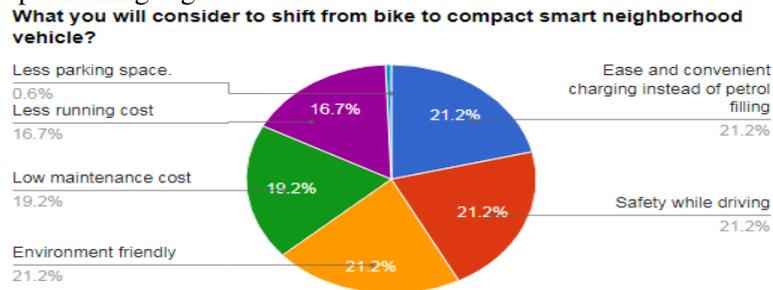
Suggestion and Recommendation: To gain competitive advantage company should register and file patent for its various new products. Company should focus on market penetration through focus marketing, referral scheme, various finance options, etc. Once company able to get gain market share then company can think of moving to new market with top notch existing products. Here focus should be developing strong distribution and service center network. Also, pan India presence and dominance should be targeted. Care should be taken that not all products should be introduced once, rather systemic plan should be prepared considering culture and preference.

2. MARKET ANALYSIS:

In this topic, we will talk about go to market strategy, customer acquisitions, STP.

2.1 SEGMENTATION FROM SURVE

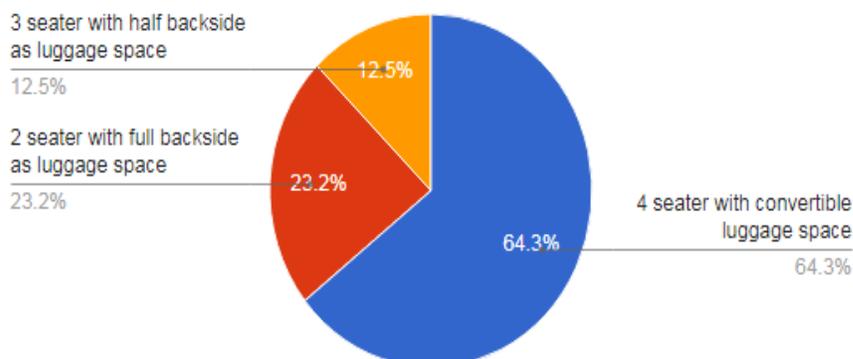
Following is survey analysis for performing segmentation.



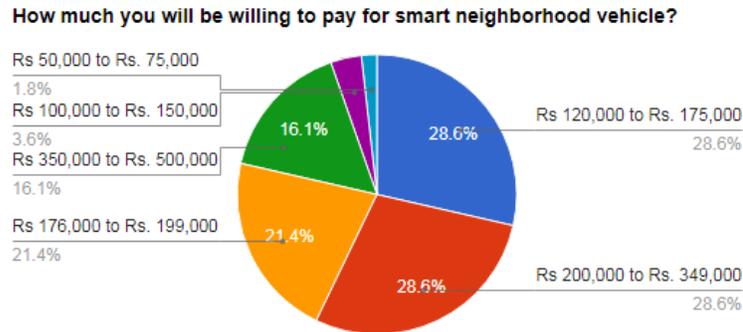
Company to focus on delivering ease and convenient charging, safety while driving, Environment friendly and low maintenance cost which respondent are looking to switch to smart neighborhood vehicle. R&D to focus on solving existing problems such as charging hassles.

Almost 64% of the respondent travel 26km to 75km and R&D to focus on increasing distance travel per charge. Company need to work on establishing charging network so that customers can charge batteries or replace batteries. Feature such as 25km alert and distance travel with current charging will be useful indicators for users to plan their travel.

How many seats will you prefer in smart neighborhood vehicle?



Company should focus on customer requirement for building solution and need to come up with innovative solution which can cater all the combination.



Here we have received mix responses for each price segment. Further analysis need to be made before taking any decisions. Company need to map these respondents to price, features expected and other parameters to understand their readiness to buy. Also, understanding of respondent who are not willing to go for it may also provide some clues to while product development. In longer run, it should consider upgrade options as well ranging from basic to advance. Overall from survey it has analyzed that 78% responded where like to consider compact smart electric neighborhood vehicle to buy. This shows there is willing and acceptance in such kind of vehicle.

2.2 CLUSTER ANALYSIS FOR SEGMENTATION

Principal component analysis is done to get the segmentation on survey data.

Variance Matrix by principal components (3 components):

Row scaling method used is unit variance scaling and PCA Method is SVD with imputation.

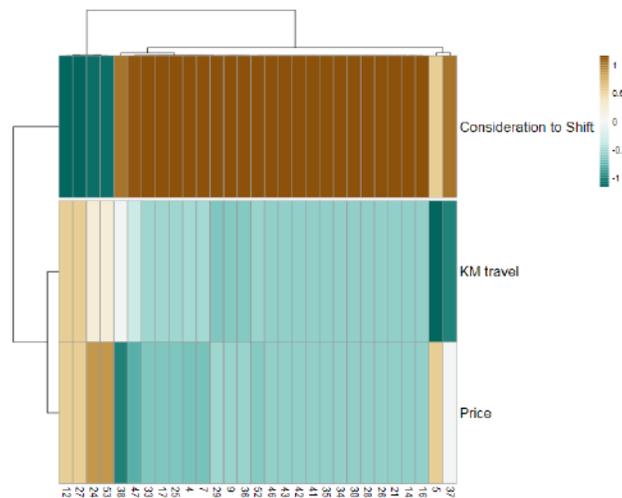
	PC1	PC2	PC3
Individual	0.95	0.05	0.00
Cumulative	0.95	1.00	1.00

Principal components (3 data points in rows, 3 components in columns):

	PC1	PC2	PC3
Consideration to Shift	-6.05	0.04	-0.00
KM travel	2.90	-1.25	-0.00
Price	3.15	1.22	0.00

Heat Map:

Columns are centered; unit variance scaling is applied to columns. Both rows and columns are clustered using correlation distance and average linkage. 3 rows, 29 columns.



Suggestion and Recommendation: Survey caters to psychographic and behavior segmentation and following are variables.

Psychographic: distance travel, number of seats, bike or car steering, 3/4 wheels, price of car.

Behavior: Benefits (such as Easing of charging, environment friendly, etc), open or closed car, Readiness stage. From PCA analysis and heat map analysis, segments can be formed by using variables such as consideration to shift, KM travel and Price. From this survey, it conveys that, we need to consider different versions of vehicle to cater various segments of customer who are price sensitive and wanted various features. Company should plan positioning such that it should have basic version and variants with additional features or basic version and various required features can be plugin in on user demand. However, this survey study need to combine with demographics geographic segmentation to get effective segments.

2.3 COMPETITIVE POSITIONING

Competitive positioning is about defining how we will differentiate our offering and create value for our market. It's about carving out a spot in the competitive landscape.

A good positioning strategy is influenced by:

- **Market profile:** Size, competitors, stage of growth
- **Customer segments or personas:** Groups of prospects with similar wants and needs
- **Competitive analysis:** Analysis competitive strength with Porter's Generic Competitive Strategies, Blue Ocean Strategy, Value Chain Analysis, Ansoff Matrix, USP Analysis, Core Competencies Analysis, etc.
- **Method of delivering value:** How you deliver value to your market at the highest level.

***Suggestion and Recommendation:** EV market is increasing faster than anyone thought off. Existing product targeting should be for niche area of golf course, airports, SEZ and Infra city, big universities, amusement parks, big company campuses, etc. Company need to target urban and rural population with different set of products. For urban, company can target city travelers such as working professional, housewife's, Sr. citizen, college going students. For rural, company may target small shop merchants, farmers who requirement is travel with some heavy weight luggage with them. Company can target B2B, B2C urban, B2C rural to get competitive advantage over competitors continuously add value to product and increase product line using focus differentiation strategy of Porter Generic Strategy. Value chain analysis need to understand properly and implemented to get cost down without compromising on quality or features. Same can be used to understand areas of differentiation and need to be worked out to get sustainable advantage. Company need to work on Blue ocean and implement them to differentiate itself. Omni channel marketing and effective distribution coupled with quality service is key area to focus to give unique experience to the end user.*

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Emerging Scope of Bancassurance in Banking & Insurance Sectors

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Abstract: Bancassurance is defined as the insurance distribution model where insurance products are sold through bank branch network. With a network of over huge branches, spread across the length and breadth of the country, banks are having the necessary potential to make Bancassurance the most efficient way to achieve financial inclusion in insurance sector also. In 1980 first time, Bancassurance term was used in France. The success of bancassurance in France attracted the attention of banks and insurers, in other parts of the world.

Bancassurance still

The objective of this research is to:

- 1. Study the relevance of Bancassurance as a service product in Banking and Insurance Industry.*
- 2. Analyze the prospects of financial engineering and innovation in Bancassurance Products.*
- 3. Identify the challenges in expanding the market of Bancassurance products in rural areas.*

Key words: Bancassurance, Financial Engineering, Challenges, Banking and Insurance

1. INTRODUCTION:

Bancassurance is defined as the insurance distribution model where insurance products are sold through bank branch network. With a network of over huge branches, spread across the length and breadth of the country, banks are having the necessary potential to make Bancassurance the most efficient way to achieve financial inclusion in insurance sector also. In 1980 first time, Bancassurance term was used in France. The success of bancassurance in France attracted the attention of banks and insurers, in other parts of the world.

Bancassurance as a concept first began in India when the insurance industry opened up to private Participation in December 1999. There are basically four models of bancassurance:

- Distribution alliance between the insurance company and the bank.
- Joint venture between the two companies.
- Mergers between a bank and insurer.
- Bank builds or buys own insurance products

2. STATEMENT OF PROBLEM:

Open architecture for bancassurance has opened up new possibilities for expansion of distribution with possible implications on both the top and bottom line of the insurance business, while at the same time serving customers better with a wider range of choices. Another development to watch out for is the impending implementation of GST in 2017 which can affect the business model.

3. OBJECTIVES OF THE STUDY:

The objective of this research is to:

- Study the relevance of Bancassurance as a service product in Banking and Insurance Industry.
- Analyze the prospects of financial engineering and innovation in Bancassurance Products.
- Identify the challenges in expanding the market of Bancassurance products in rural areas.

4. REVIEW OF LITERATURE:

Dr. D.Rajasekar T.Hymavathi Kumari(2014) In this research Banc assurance has broadened the scope of retail banking. As per IRDA, the major driver of Bancassurance has been the private sector companies both in the bank as well as in the insurance gamut. This paper is to study the bancassurance, its origin scope, need for bancassurance and SWOT analysis of bancassurance in India. The paper stressed on the success of bancassurance greatly hinges on banks ensuring excellent customers relationship; therefore banks need to strive towards that direction.

Low (2004),The author observed in this paper that changing mindset is cascading through the banking sector in India and this would be a right time for banks to resorting to bancassurance, especially in the context of proactive policy environment of regulatory Authorities and the Government. The fact that the banking operations in India, unlike in other developed countries, are still branch oriented and manually operated vis-à-vis highly mechanized and automated banking channels, viz., internet banking, ATMs, etc. are all the more conducive for flourishing of bancassurance.

V.V Ravi Kumar highlights the increasing importance of cross- selling in financial services sector. Banks are also inclined to leverage their vast distribution networks to augment their non- interest income. Bancassurance with its origins in France is also an important component of such an effort in view of the added thrust on retail. With only about a quarter of the insurable population covered under insurance, insurers see a great potential in bancassurance as it offers them a readymade distribution platform with a tremendous distribution network. The concept though in its early stages offers immense potential for the future in India.

Dr. Georgee K. I. Sumi Alex, 2010, “Bancassurance : A Futuristic Convergence”. The author discusses the changed equation between banking and insurance businesses under the current circumstances. The author states by concluding that the current situation doesn’t indicate any paradigm shift in bancassurance. The future of bancassurance seems to be bright.

Prospects & Scope of Financial engineering and innovation in Bancassurance sector

Emergence of New Regulatory framework

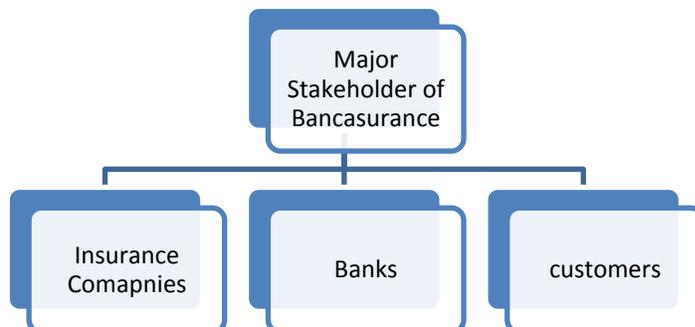
Emergence of New Regulatory framework in the area of Bancassurance will also enhance the scope of Bancassurance product in India. Now the Banks also can be partner for multiple insurance companies. This will be beneficial for all the stakeholders of Bancassurance products.

Earlier Framework	New Regulatory Framework
Banks could only sell products of one life, one non-life and one standalone health insurer.	Banks are allowed to tie-up with three life, three non-life and three standalone health insurance companies

SWOT ANALYSIS of Bancassurance Sector

Strength <ul style="list-style-type: none"> ❖ Established customer base of banks ❖ Negotiation power enjoyed by the banks. ❖ Wide network of Banks in Rural India 	Weakness <ul style="list-style-type: none"> ❖ Lack of Awareness ❖ Lack of Proper Marketing ❖ Less efforts through rural banking
Opportunities <ul style="list-style-type: none"> ❖ Huge scope for insurance sector ❖ Untapped rural markets ❖ Financial innovation in Products 	Threats <ul style="list-style-type: none"> ❖ Changing Technology ❖ Change regulatory framework ❖ Lack of Recourses

Benefit of Potential benefits of bancassurance as a structured banking product to various stakeholders.



To the Insurance companies –

- Development of new financial products in collaboration with banks
- Tap the potential market with customers of the bank
- Make use of various products through various channels used by the banks for market penetration

To Banks

- Enhanced portfolio with multi products on the plate
- Leverage on existing customer base of the insurance companies
- Can look into integrated financial services to the customers

To customers

- Customers get wide range of products from banking to insurance products
- Facilitates easy premium payments can they are linked to bank account
- Receive advise and consultancy from the banks on various products available
- Can serve as an additional source of income in addition to interest

Financial Engineering in Bancassurance Products

Bancassurance has generated the interest and both banks and insurance companies are trying to explore more and more innovating ways of making it more attractive to the customers. They are innovating by doing lot of innovation in the basic products. Banks and insurance companies still need to do more financial engineering on these products. Banks has to focus more on engineering part that how they can align insurance with their products. Some banking products has the huge scope to embedded insurance component in them. Banks and insurance companies can do alliances for launching such products,. As a bancassurance strategy there is the need for the product evolution on the banks aspect. There is also the scope of innovation in linking between the bancassurance product and capital links, It will be a lot of beneficial for the customer if got the products which are catering to their multiple needs through one product.

Prospect of Bancassurance in emerging economy like India

Indian Insurance in the Global Scenario: Globally, the share of the life insurance business in total premium was 56.2 per cent. However, the share of life insurance business for India was very high at 79.6 per cent while the share of non-life insurance business was small at 20.4 per cent. In life insurance business, India is marked 11th among the 88 countries, for which data is published by Swiss Re. India's share in global life insurance market was 2.00 percent during 2013. However, during 2013, the life insurance premium in India declined by 0.5 percent (Inflation adjusted) when global life insurance premium increased by 0.7 per cent. The Indian non-life -insurance sector witnessed a growth of 4.1 per cent (inflation adjusted) during 2013. During the same period, the growth in global non-life premium was 2.3 per cent. However, the share of Indian non-life insurance premium was small at 0.66 per cent and India ranks 21st in global non-life insurance markets.

A) Bancassurance market revenue in the Asia Pacific region 2013–2018

US\$ Billion						
Year	2013	2014	2015	2016	2017	2018
Bancassurance market revenue	129.50	135.22	144.02	155.98	173.23	191.41

Source(<https://assets.kpmg.com/content/dam/kpmg/pdf/2016/03/power-of-alliance.pdf>)

B) Market Share of Bancassurance in India(Individual segment)

Year	2014(crores)	2015 (crores)	2016 (crores)	2017 (crores)
Market share	9500	11000	14000	17000

Bancassurance contributed 7 percent of total health insurance premium and online sale of health insurance policies contributed 2 percent of total health insurance premium. Another important distribution channel for Group business of the private insurers was Banks. During the year 2015-16, Banks contributed 8.79 per cent of the total group business in case of the private insurers. This figure stood at 10.36 per cent in the previous year.

C) New Business Premium Contributed by Bancassurance in 2015-16 (Figures are in % of Premium)

Life Insurer	% Contributed by Bancassurance

Private Player	35.48%
LIC	.73%
Industry Total	10.99%

Source (Annual Report 2015-16 IRDA)

The concept of Bancassurance is still in nascent stage in India and expected to grow with steady pace in near future. Banking is one of the core sector in India and we can see a big and emerging scope of the partnership of the banking sector with insurance sector with respect to selling of insurance products through banks.

Following are the main reasons for the emerging prospects of the bancassurance product –

1. Robust banking infrastructure spreading across length and breadth of the country
2. Favourable support from the Government to bring FDI in the economy
3. Awareness of various insurance products among working class
4. Indian economy is growing and steps taken to promote growth in various sectors.
5. Purchasing power of the people of the country is reflecting increasing trend
6. Partnership being entered in large number with banks to promote insurance product

India's rural market has a significant potential yet to be explored the Indian Insurance Companies. Setting up their own networks across rural areas entails will be of significant cost, that no insurance company would be interested in doing so. Bancassurance again comes as an answer. It helps the insurance companies to tap the market at a much lower cost. As for the customer the competitive nature of the Indian market ensures that the reduction incosts would result in benefits in terms of lower premium rates being passed on to him. The penetration level of life insurance in the Indian market is abysmally low at 2.3% of GDP with only 8% of the total population currently insured. With almost half of the population are classified as wage earners. there is every reason to be optimistic that bancassurance in India will play a long inning in Indian sector.

The prospect of Bancassurance product appears to be growing at a rapid pace both through commission based agents and Joint Ventures between banks and insurance companies. Indian Banks have immense reach to the households.

A distinct feature of the recent trend in tie-up arrangements was that a number of cooperative banks have roped in with bancassurance agreement. This has added advantage for insurer as well as the cooperative banks.

Following are the financial benefits accrues to the bank

- Increased revenue generated in the shape of commissions on account of the partnership with insurance companies.
- Reduction of the consequence of the bank fixed costs, as they are now also extending over the life insurance relationship
- Opportunity to boost the efficiency of staff, as they now have the chance to offer a wider array of services to client services in the years to come.

Challenges faced by Bancassurance Sector

a). Cultural Compatibility: The issue of cultural incompatibility can impede bancassurance business to a great extent. Alternatively, if the insurance subsidiary of the bank has to maintain the entire paraphernalia, comprising research, administrative, distribution and other staff, it would be too costly, and in some cases, the cost restrictions would not permit it to indulge in this.

b) High procurement cost and Long break Even point period prevailing in insurance sector is also one of the challenges in the successful operation of bancassurance.

c) Lack of Technological developments in the insurance sector is also one the challenge which insurance industry is facing .Success of bancassurance depends upon the extent to which and how fast the technology being used for banking operations can be used for meeting the technology requirements for insurance business.

d) Lack of motivation and other working style differences among the banking employees also put challenge in the development of bancassurance product. Banks selling insurance products may be required to provide incentive packages in addition to the regular remuneration to drive the sales. Maintaining the same service levels for insurance business as that for the banking services may be one of the biggest challenge.

e) Low penetration in the rural market is also one of the challenges which is faced in the development of bancassurance product in India. Still there is a lot of scope to do in this direction. Rural market in India requires lot of awareness to be conducted about these products.

Future Outlook of the Bancassurance Sector in India

The outlook for bancassurance remains optimistic. India has already more than 250 million middle class population with reach to strong banking network with largest depositors base, there is greater scope for use of bancassurance products in every part of the country.

Given the current relatively low bancassurance penetration in India, bancassurance will likely see further significant development in the years to come including rural sector. In India the bancassurance model is still in its nascent stages, but the tremendous growth and acceptability in the last three years reflects positive growth in near future. The deregulation of the insurance sector in India has resulted in a phase where innovative and extensive distribution channels are being explored. In this phase, bancassurance has simply performed extremely in the banking and insurance sector. To be fruitful, it is vital for bancassurance to ensure that banks remain fully committed to promoting and distributing insurance products. This commitment has to come from both senior management in terms of strategic inputs and the operations staff who would provide the front-end for these products. In India, the signs of initial success are already there despite the fact that it is a completely new sector. There is no doubt that banks are set to become a significant distributor of insurance related products and

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**‘Sanjyot-2018’ National Seminar on
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Kopargaon, Dist- Ahmednagar, Maharashtra, India,**

Short Term Power Demand Forecasting

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Abstract: In smart infrastructure development electricity is more important factor. Now a days electricity generation, its reliable as well as secure transmission is big challenge. There is also problem in overestimation and underestimation of electric load. Electronic power conditioning, control of the power generation and distribution of electricity these are the important aspects of smart grid.

The proposed power demand forecasting system uses hybrid algorithm. It combines wavelet transform, FUZZY ARTMAP and fireflies algorithm to predict the hourly day ahead loads. It takes input as holiday information, seasonal information, and meter reading on the real time basis to predict the load. It also takes the standard historical data set as a input. The real-time data will be gathered using sensor nodes. System will forecast the electricity information with better accuracy that will make human life more comfortable.

Keyword: Artificial intelligence, Wavelet Transform, Fuzzy ARTMAP, Firefly.

1. INTRODUCTION:

Although the electricity industry has seen a revolutionary change over the last few years in India face the risks of over estimation and underestimation of electricity usage overestimation causes the electricity industry to come with additional energy sources like generating plant, which is unnecessary and leads to wastage whereas underestimation leads to delivery of poor quality of services like blackouts and compels the industry to buy energy from external sources. The electricity industry in India has experienced an urgent need for proper methodology to understand the above problem and come up with almost accurate solution for the problem. Most of the Methods used today are top down approaches i.e. demand forecasting begins with big pictures like total generation of electricity and it is then broken down into component parts like adjustment due to transmission loss.

The biggest disadvantage of this method is that it does not consider the climate specific impacts. Example, desert area (high temperature), coastal area (humid climate) etc. Hence the bottom up approach comes into picture where we consider granular sources of data like climate condition, prices, seasonal data etc. to give more accurate predictions. Moreover it is an area specific approach. Huge set of data is collected from a specific area it is processed using various prediction and optimization algorithm and a final forecasted value is generated. In this method we consider the seasonal data like local climatic changes, temperature as well as variation in electricity prices which gives precise result of prediction.

2. LITERATURE REVIEW:

In the procedure of forecasting proposed in “Fuzzy ARTMAP and GARCH-based hybrid model aided with wavelet transform for short-term electricity load forecasting” past load is first decomposed using wavelet transform. Fuzzy ARTMAP is then used on one approximated on two decomposed series whereas GARCH is used on the other decomposed series to obtain the forecasted series. The forecasted series is then reconstructed using wavelet reconstruction. The hybrid algorithm gives the mean absolute percentage error of approx. 3.1% [1].

“A Fuzzy Logic Based Short Term Load Forecast for the Holidays” proposes two models one which uses unscaled load and the other that uses scaled load. The author mainly proposes the model that uses Fuzzy logic without considering the weather information. They have considered holiday parameter for forecasting the power demand. Classification of holidays is done on the basis of their characteristics and historical load shapes. Historical data from past year consumption, type of holiday whether it is a national holiday or religious holiday are selected in order to give precise forecasted values. The final results show that model 2 which uses scaled past input gives better result as compared to model 1 [2].

“Performance Evaluation of Different Optimization Algorithms for Power Demand Forecasting Applications in a Smart Grid Environment” proposes the hybrid model which consists of wavelet transform, Firefly algorithm, FUZZY ARTMAP. These algorithms are used for obtaining decomposed, optimized, and forecasted values respectively. The authors have compared MAPE of alternative methods and concluded that WT+FA+FF are more efficient [3].

“Residential Power Load Forecasting” by proposed Short Term Power Demand Forecasting for residential area. The basic concept suggests the use of electricity as telephone prepaid where one can use method of pay as you go. The paper suggests efficient application of short term power demand forecasting [4].

In “A methodology for Electric Power Load Forecasting” Electricity demand pattern is usually complex due to variability in consumption of electricity over time. The paper proposes a methodology for forecasting the future load demand for short medium and long term demands. The methodology proposed mainly focuses on segmentation and decomposition of input time series load. Future load forecast is based on 3 bases- region similarity, contour, proposed related point and their combined forecast [5]. Another paper proposed a method for forecasting load of daily and hourly energy consumption using ANN. In this Neural Network is used for forecasting the future load demand. It uses Levenberg Marquardt algorithm for fast training of neural network. This technique is also used for forecasting power demand for random day, the next hours using a Boolean metering system [6].

“A Novel Hybrid Approach Using Wavelet, Firefly Algorithm, and Fuzzy ARTMAP for Day-Ahead Electricity Price Forecasting” proposes a hybrid algorithm for forecasting a day ahead electricity prices in Ontario market. The hybrid model consists of WT for data filtering, FF for optimization and fuzzy ARTMAP for Soft computing. This method gives better performance in forecasting daily and weekly prices [7].

“Short term electricity forecasting using individual smart meter data” proposes a technique used for forecasting electricity usage at individual household by deploying one smart meter in that household. The method uses neural network and SVM techniques. These techniques are used for forecasting electricity usage on hourly basis i.e. forecast power consumption for next 24 hours. [8].

3. SYSTEM ARCHITECTURE:

The system architecture is as shown in Figure 1. It consists of wavelet transform, Fuzzy ARTMAP and Firefly. It uses seasonal and holiday information for prediction.

4. WAVELET DECOMPOSITION:

Wavelet decomposition algorithm is used to decompose input data set into the set of constitutive series. This method having good filtering effect due to which output set has better behavior. Low frequency provides non-detail information of the signal and the high frequency provides detail information of the signal. In this, we will use three decomposition details (D1, D2, and D3) and one approximate (A3) Signal.

In wavelet decomposition, low frequencies (large scale) expand the signal and provide non-detailed information regarding the signal, whereas high frequencies (low scales) compress the signal and provide detailed information about the signal. The wavelet decomposition involves filtering and down sampling operation.

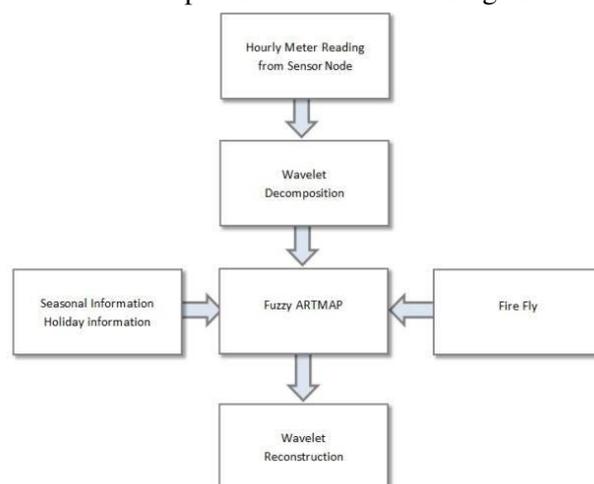


Figure 1: System Architecture

5. Fuzzy ARTMAP

This model is based on the fuzzy adaptive resonance theory. This method is powerful because FA is able to carry out learning without forgetting previously learned input. It can store the previous output and can be self-organize. This technique is better than the Neural Network (NN) because the FA technique addresses this dilemma by incorporating a feedback mechanism between the competitive and input layers to allow new information to be learned without eliminating previously obtained knowledge. Results in a more stable learning environment and a faster

convergence capability. The Fuzzy ARTMAP is constructed from decomposed values of wavelet, Seasonal data and optimized values from the fireflies.

6. FIREFLIES

This is a good optimization algorithm which is based on the flashing behavior of fireflies, or lighting bugs. This algorithm uses following three rules of the firefly:

- All fireflies are unisex, and they will move towards the more attractive and brighter ones regardless of their gender.
- Attractiveness is proportional to their brightness, which decreases as the distance from the other firefly increases, and if there is not a brighter or more attractive firefly than a particular one, it will then move randomly.
- The brightness of a firefly is determined by the value of an objective function of a given problem.

7. RESULTS AND DISCUSSION

The proposed power demand forecasting is based on hybrid wavelet transform, Fuzzy ATPMAP and Firefly algorithm. The system is trained and tested using data available with Maharashtra State Electricity Distribution Co.Ltd.

The data set consist of individual feeder information forelectric power consumption in MW. It has nearly 10 lac records with 9 attributes named-feeder_name, zone, circle, division,station_no,feeder_no,date, time,load (MW) .

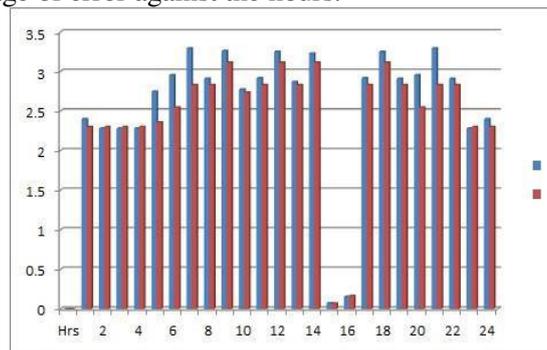
Table 1:Load Forecating a Day

Hrs	Forecasted Load	Actual Load	Percentage Error
1	2.3980	2.2999	4.2665
2	2.2809	2.2999	0.8238
3	2.2809	2.2999	0.8238
4	2.2809	2.2999	0.8238
5	2.7474	2.3577	16.5304
6	2.9547	2.5463	16.0426
7	3.2917	2.8292	16.3478
8	2.9096	2.8292	2.8434
9	3.2595	3.1121	4.7366
10	2.7736	2.7349	1.4154
11	2.9161	2.8292	3.0722
12	3.2493	3.1121	4.4112
13	2.8699	2.8292	1.4411
14	3.2291	3.1121	3.7602
15	0.0745	0.0698	6.7407
16	0.1562	0.1698	8.0017
17	2.9161	2.8292	3.0722
18	3.2493	3.1121	4.4112
19	2.9096	2.8292	2.8434
20	2.9547	2.5463	16.0426
21	3.2917	2.8292	16.3478
22	2.9096	2.8292	2.8434
23	2.2809	2.2999	0.8238
24	2.3980	2.2999	4.2665

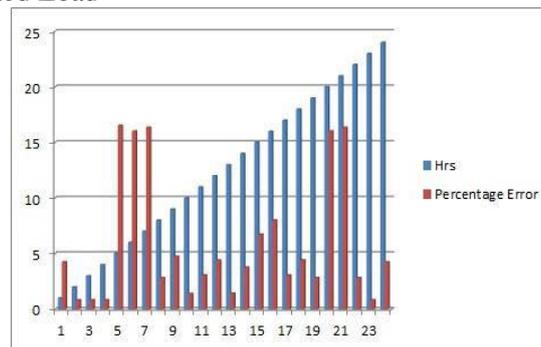
The MAPE (mean absolute percentage error) method is used as a major criterion to evaluate the forecasting performance of all the models. The MAPE is defined as:

$$MAPE = \frac{1}{N} \sum_{i=1}^N \frac{|L_i^{true} - L_i^{forecast}|}{L_i^{true}} * 100\%$$

The graph 1 shows the statistics for actual load and forecasted load. It shows the prediction is closer to actual values. Graph 2 shows the percentage of error against the hours.



Graph 1: Actual Load and Forecasted Load



Graph 2: Percentage of Error vs Hours.

8. CONCLUSION

The electricity industry around the world is advancing with the breakneck speed with technologies like smart meter that is AMI (Advanced Meter Infrastructure) and smart grids. The experimental results show the accuracy of the system. Problems like overestimation and underestimation of power demand can be simply nullified by using efficient hybrid algorithm which can together give an efficient and precise way for prediction of electricity which can help various sectors like maintenance planning for generators, dispatch scheduling of generating capacity, interchanging, purchasing of electric power, load switching etc. For future work, we intend to collect the data using the sensor nodes. This can further contribute to the sustainable development of nation.

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Influence of Shoulder Diameter of Tool in FSW on Tensile Strength of Aluminium Alloy 6082 T6

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Abstract: In many applications steel is replaced by non-ferrous alloys. Low weight aluminium alloys are used now days. Welding of aluminium alloys by conventional way cause serious harm. Friction stir welding (FSW) is relatively a solid state welding process, eco friendly and also eliminate the problems of solidification associated with the conventional fusion welding processes. In this project work we develop the relationship between FSW parameters (tool rotation, tilt angle and welding speed) with different tool shoulder diameters and tensile strength of friction stir welded aluminium alloy AA 6082 T6. Taguchi method with ANOVA was adopted for analyzing the problem where number of variables influences the response. From the main effects plot for SN ratios it is cleared that tool shoulder geometry is the most influencing factor among all four factors.

Keywords: ANOVA, Design of experiment, Friction stir welding, Taguchi method.

1. INTRODUCTION:

The need for joining materials having higher hardness property and tensile strength has arisen with the present advancement in science and technology. Friction stir welding (FSW) is a recent addition to the welding process and it is a solid state joining technique (R.S. Mishra et al., 2005), it was performed on Al and its alloys is now carried out on copper, magnesium and different material combinations. Different tool pin profiles have been used to weld aluminum alloys (A. Scialpi et al. 2007), and it has been found that the tapered pin gave defective welds when compared to other profiles. When FSW of steels is performed by straight pin profiles, pin failure takes place before the complete insertion, and moreover, the weld joint could not be formed due to rapid tool wear. The amount of friction heat produced for a better weld depends mainly on the process parameters, such as the tool rotational speed, plunge depth, plunge force, tool tilt angle and travel speed (A. S. Vagh et al., 2012). Apart from the highest influencing process parameters, such as the rotating speed of the tool and traverse speed in FSW, the tool tilt angle is an added process parameter which could give better results in the FSW of steel (A. Pradeep et al., 2013). Tensile strength is the powerful mechanical property to optimize the process parameter of the weld to achieve a better joint (Z.Y. Ma et al., 2006).

The most efficient and simple way of designing an experiment can be achieved by the Taguchi method (B.T. Gibson et al., 2013) which helps to find out the most significant process parameter among the parameter combinations, by using the analysis of variance (ANOVA) and signal-to-noise ratio (S/N) (Vijjanet al., 2007). The effect of the process parameters by welding with a shorter conical pin on the strength properties has been studied with the influence of the process parameters and their combinations to produce a defect free weld. L9 orthogonal array of the Taguchi design method has been used, because it is easy to use and solve complex problems more efficiently. The Calculation of the S/N ratio and mean response, by the ANOVA gives the most influential process parameter, while the mean effect of the plot for the S/N ratio and mean response predicts the optimum process parameter. Thus, the present optimization serves main objective is to estimate the contribution of the individual process parameters, and to determine the optimum combination of the process parameters for better possible strength.

Shrikant G.Dalu and M. T. Shete investigated effect of various process parameters on friction stir welded joint. This paper investigates the effect of various process parameters on quality of the welded joint. Investigates the effect of welding speed and tool pin profile on friction stir processing zone formation in AA2219 aluminum alloy. They found that the square pin profile tool at a welding speed 45.6mm/min, produced mechanically sound and metallurgical defect free welds with maximum tensile strength, higher hardness

From the above review it is observed that The Tool rotation speed, traverse speed, axial force and tool design are the most significant process parameters in friction stir welding. The rate of heat generation as well as the peak

temperature is relatively higher in the case of non-circular pin profiles, increasing with the number of flats. Also some papers results show strong relation and robust comparison between the weldment strength and process parameters. Tensile strength is found to increase with increase in rotational speed. Maximum Tensile strength of 172 Mpa was observed at 1350 rpm (for 115 mm/min feed) for IS 64430 AA6351 Al alloys, higher range of rotational speed is best suited to achieve maximum tensile strength. Tensile strength is higher with lower weld speed. This indicates that lower range of weld speed is suitable for achieving maximum tensile strength. The hardness variations also correlate well with the mechanical property characterisation of different welds, through tensile testing experiments for strength and ductility of the welds (both in the transverse and longitudinal test), as the tool pin profiles changes from circular to hexagonal. The influence of pin profile on weld quality in FSW may have even greater significance when joining relatively thicker plates. The experiments based on three process parameters, namely, the tool rotational speed, tool tilt angle and the travel speed.

After studying the above papers we came to the conclusion that the main process parameters on which the welding strength depends are feed, angle of tilt, and spindle speed. Further the results can be optimised by using various optimisation techniques such as Analysis of Variance and Particle Swarm Optimisation technique. This result has to be implemented to test the specimen by taking the optimum parameters for friction stir welding and results should be compiled with the optimum values.

2. METHODOLOGY

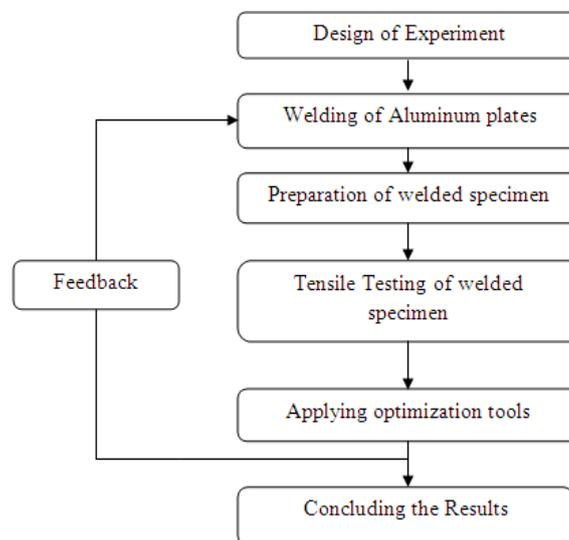


Fig. 1. Flowchart Methodology of FSW Process

For the welding purpose the plates of aluminum AA6082 were prepared then these plates were welded by using a square profile tool with single pass and double pass. The specimens were prepared and tested on universal testing machine. The obtained results of the tensile strength were optimized by using the optimization techniques like ANNOVA. Thus optimum values were found.

3. EXPERIMENTAL METHOD:

Working of friction stir welding

Friction Stir Welding (FSW) is a simple process in which a rotating cylindrical tool with a shoulder and a profiled pin is plunged into the butting plates to be joined and traversed along the line of the joint. The plates are tightly clamped on to the bed of the FSW equipment to prevent them from coming apart during welding. A cylindrical tool rotating at high speed is slowly plunged into the plate material, until the shoulder of the tool touches the upper surface of the material. A downward force is applied to maintain the contact. Frictional heat, generated between the tool and the material, causes the plasticized material to get heated and softened, without reaching the melting point. The tool is then traversed along the joint line, until it reaches the end of the weld.

As the tool is moved in the direction of welding, the leading edge of the tool forces the plasticized material, on either side of the butt line, to the back of the tool. In effect, the transferred material is forged by the intimate contact of the shoulder and the pin profile. In order to achieve complete through-thickness welding, the length of the pin should be slightly less than the plate thickness, since only limited amount of deformation occurs below the pin. The tool is generally tilted by 1-4°, to facilitate better consolidation of the material in the weld.

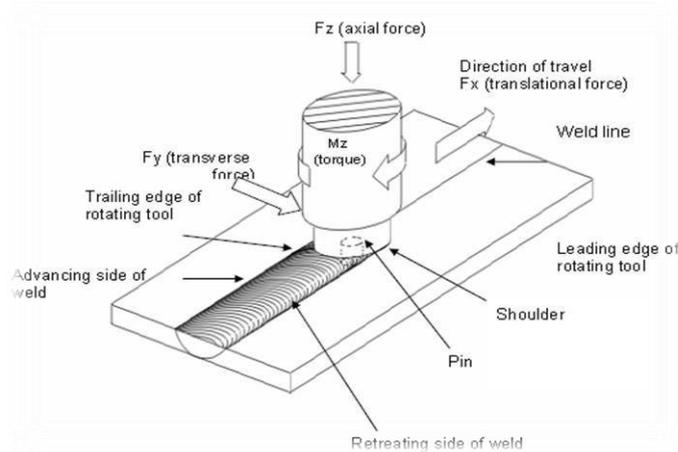


Fig. 2.Schematic representation of FSW process

According to the L27 orthogonal array, nine experiments in each set of process parameters have been performed on AA6082 T6 plates with all three tools having different shoulder geometry. The three factors used in this experiment are the rotational speed, weld speed i.e. feed and tool tilt angle. The factors and the levels of the process parameters are presented in Table II for three tools with different shoulder diameter. The experiment's notation is also included in the L27 orthogonal array which results in an additional column, in order to represent the parameters, as presented in Table III. The experiments are performed on a vertical milling machine which serves to perform the FSW operation. It is a well known factor that at higher rotating speed, FSW produces high heat input and these three levels were selected as low, medium and high speed among the highest speeds available in the machine. Only at low travel speeds, the weld could be achieved with a shorter pin and hence the three least travel speeds were taken. For the thickness of 5mm plate, and hence 1°, 2° and 3° tool tilt angles were taken.

TABLE I
PROCESS PARAMETERS AND THEIR LEVELS

Process parameters	Levels		
	1	2	3
Tool	1	2	3
Tool rotational speed(rpm)	580	700	910
Weld speed(inch/min)	1	2	3
Tilt angle(degrees)	1	2	3

TABLE II
L27 (3⁴) ORTHOGONAL ARRAY FOR FINAL EXPERIMENTATIONS

Sr. No.	Tool No	Tool rotational speed(rpm)	Tilt Angle (degrees)	Weld speed (inch/min) (degrees)
1)	1	580	1	1
2)	1	580	2	2
3)	1	580	3	3
4)	1	700	1	2
5)	1	700	2	3
6)	1	700	3	1
7)	1	910	1	3
8)	1	910	2	1
9)	1	910	3	2
10)	2	580	1	1
11)	2	580	2	2
12)	2	580	3	3
13)	2	700	1	2
14)	2	700	2	3
15)	2	700	3	1

16)	2	910	1	3
17)	2	910	2	1
18)	2	910	3	2
19)	3	580	1	1
20)	3	580	2	2
21)	3	580	3	3
22)	3	700	1	2
23)	3	700	2	3
24)	3	700	3	1
25)	3	910	1	3
26)	3	910	2	1
27)	3	910	3	2

Tool Selection

According to K.Ramanjaneyulu, G. Madhusudhan Reddy, A. Venugopal Rao, and R. Markandeya,[8] Experiments were conducted with different tool pin profiles (conical, triangular, square, pentagon, and hexagon cross sections) maintaining the same swept volume during the tool rotation. The shoulder diameter was also kept constant for all tools at 12 mm; thereby ensuring that the pin profile is the only variation from tool-to-tool. In other words, the pin-to-swept volume ratio varies due to changes in the physical volume of the pin only.

In our project work we had studied various papers and finally we have selected square pin profile with different shoulder diameters and. Fig. 3 shows these tools.

TABLE III
FSW TOOL PARAMETER

Tool parameter	Dimensions
Pin length	4.7 mm
Shoulder diameter	Tool 1: 12 mm
	Tool 2: 14 mm
	Tool 3: 16 mm
Taper angle	14°



Fig. 5. Welded Specimens

Preparation of Tensile Test Specimen

Transverse tensile test samples are prepared from welds joints according to the ASTM specifications, E-8M-08 [ASTM-2008] by vertical milling machine at R and R Associates at Kopargaon using specimen of two inch gauge length as shown



Fig 7.Tensile Strength Specimen

Tensile Strength of Weld Specimens

Tensile strength of weld specimen is measured by Universal Testing Machine at VSP testing and calibration lab, MIDC Ambad, Nasik. Table 4 below shows tensile strength.

We get maximum tensile strength of 190.55 N/mm² for tool no. 2 with tilt angle 2^o and rotational speed 700 rpm with weld speed 3 inch/min.

TABLE IV
TENSILE STRENGTH FOR SPECIMEN

Sr. No.	Tool No	Tool rotational speed(rpm)	Tilt Angle (degrees)	Weld speed (inch/min) (degrees)	Tensile Strength N/mm ²
1)	1	580	1	1	158.82
2)	1	580	2	2	140.95
3)	1	580	3	3	137.13
4)	1	700	1	2	158.40
5)	1	700	2	3	179.76
6)	1	700	3	1	116.35
7)	1	910	1	3	168.45
8)	1	910	2	1	152.68
9)	1	910	3	2	164.08
10)	2	580	1	1	182.58
11)	2	580	2	2	148.40
12)	2	580	3	3	181.09
13)	2	700	1	2	169.03
14)	2	700	2	3	190.55
15)	2	700	3	1	169.74
16)	2	910	1	3	158.20
17)	2	910	2	1	169.52
18)	2	910	3	2	134.47
19)	3	580	1	1	155.48
20)	3	580	2	2	180.04
21)	3	580	3	3	145.33
22)	3	700	1	2	133.35
23)	3	700	2	3	131.27
24)	3	700	3	1	155.31
25)	3	910	1	3	146.68
26)	3	910	2	1	146.43
27)	3	910	3	2	144.70

CONTRIBUTION OF VARIABLES FOR TENSILE STRENGTH USING ANOVA

ANOVA

After performing final experiments analysis of experimental data is done by using MINITAB-17 software. The effect of various input parameters on output responses will be analyzed using analysis of variance (ANOVA).

Analysis of variance (ANOVA) test is performed to identify the process parameters that are statistically significant and which affect the tensile strength of FSW joints.

Table V indicates the ANOVA for tensile strength, table VI shows the response table for Signal to Noise Ratio and the table 7 shows the table for means .The results of ANOVA, indicate that the considered process parameters are highly significant factors affecting the tensile strength of FSW joints in the order of tool shoulder diameter, weld speed, tilt angle and rotational speed.

TABLE V
ANOVA FOR TENSILE STRENGTH

Source	DF	Adj SS	Adj MS	F
Tool	2	1680.5	840.24	2.48
TR	2	107.0	53.50	0.16
WS	2	571.6	285.79	0.85
TA	2	242.3	121.15	0.36
Error	18	6086.5	338.14	
Total	26	8687.9		

Here, DF = Degree of freedom ; Adj SS = Adjusted sum of squares ; Adj MS = Adjusted mean square ; F = Test of hypothesis ; P = Value of hypothesis.

TABLE VI
RESPONSE TABLE FOR SIGNAL TO NOISE RATIOS

Level	Tool	TR	WS	TA
1	43.63	43.97	44.00	43.82

STRENGTH USING ANOVA

ANOVA

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TABLE VI
RESPONSE TABLE FOR SIGNAL TO NOISE RATIOS

Level	Tool	TR	WS	TA
1	43.63	43.97	44.00	43.82
2	44.42	43.76	44.02	43.63
3	43.41	43.73	43.44	44.01
Delta	1.00	0.24	0.58	0.38
Rank	1	4	2	3

TABLE VII
RESPONSE TABLE FOR MEANS

Level	Tool	TR	WS	TA
1	153.0	158.9	159.1	156.3
2	167.2	156.0	160.0	152.6
3	148.7	154.0	149.8	159.9

Delta	18.4	4.8	10.2	7.3
Rank	1	4	2	3

A figure 8 below shows the main effect of means of SN ratios for tensile strength and figure 9 shows main effect plot of means

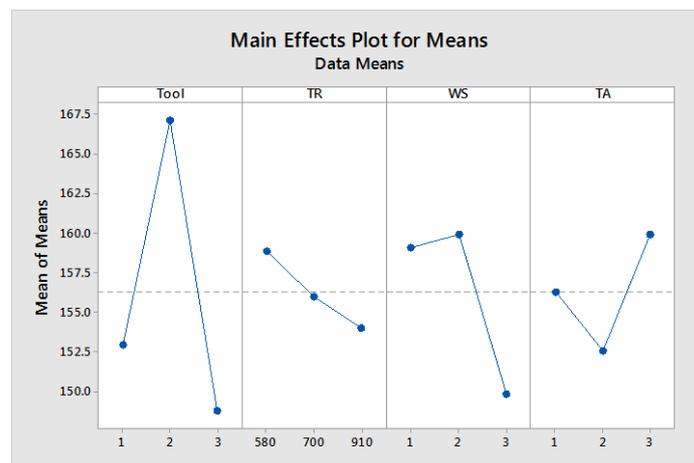
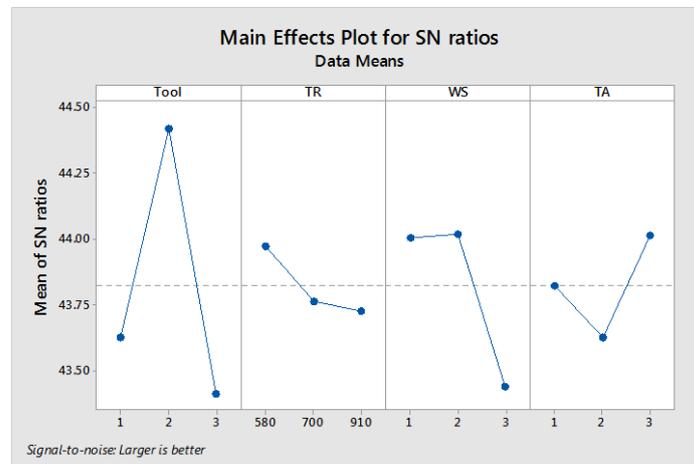


Fig. 9. Main Effects Plot of Means

From the ANOVA it is found that tool no. 2 with shoulder diameter 14 mm is the most influencing parameter among all four parameter. Weld speed is second most influencing parameter and tilt angle is the third influencing parameter and rotational speed is the last influencing parameter.

4. RESULT AND DISCUSSION:

- The maximum tensile strength of 190.55 N/mm² is achieved for tool no. 2 with tilt angle 2° and rotational speed 700 rpm with weld speed 3 inch/min with Universal Testing Machine.
- Regression model based on response surface method of DOE was developed for Tensile strength.
- ANOVA and statistical analyses confirms that model is adequate to predict the response.
- The response for Signal to Noise ratio and means shows that the most influencing factor is tool no 2 with shoulder diameter 14 mm, second is the weld speed of 3 inch/min, third is the tilt angle of 2° and last is the rotational speed of 580 rpm as shown in figure 9.
- As compare to tool 1 with shoulder diameter 12 mm, the tensile strength increases with tool 2 with shoulder diameter 14 mm but it again decreases with tool no 3 with 16 mm diameter. So we cannot conclude that the tensile strength is increases with increase in shoulder diameter.
- From ANOVA the maximum strength of joint is found at 580 rpm tool rotational speed where as in UTM testing it is found at 700 rpm is due to less variation in strength at 580 rpm for all combinations and sudden rise in strength value for 700 rpm in three combinations.

5. CONCLUSIONS:

Based on the experiments performed for tensile strength of butt weld on AA6082-T6 material using FSW process the following conclusions are drawn:

- A design of experiment and parametric study was performed to identify the effect of tool shoulder diameter, tilt angle, tool rotation and feed rate on tensile strength of friction stir welded joint, and it is found that tool shoulder diameter 14 mm is most influencing parameter.
- As compare to tool 1 with shoulder diameter 12 mm, the tensile strength increases with tool 2 with shoulder diameter 14 mm but it again decreases with tool no 3 with 16 mm diameter. So we cannot conclude that the tensile strength is increases with increase in shoulder diameter
- The maximum tensile strength of 190.55 N/mm^2 is achieved for tool no. 2 with tilt angle 2° and rotational speed 700 rpm with weld speed 3 inch/min with UTM.
- The ultimate tensile strength of butt weld reaches to 70% to 80 % of the base metal ultimate tensile strength. A. Scialpi et al [2], suggested the acceptable percentage value for tensile strength must be more than 66% of base metal. Hence the quality of this weld is considered to be good.

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Analysis of the DS CDMA system with BER and SNR parameters for Rayleigh and Nakagami-m fading channel

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Abstract: In a wireless mobile communication system, a signal can travel from transmitter to receiver over multiple reflective paths; this phenomenon is referred to as multipath propagation. The distortion of signals caused by multipath is known as fading. There are many models that describe the phenomenon of small scale fading. Out of these models, Rayleigh fading, Rician fading models are most widely used. Due to fading environment in wireless communication signal received with multiple in numbers via various paths. To overcome the effect of multipath there are various techniques, one of them is Rake Receiver to improve BER i.e. system reliability.

In this paper, we have done analysis of the DS CDMA system with the parameters like BER and SNR values, this will help us to find the efficient system by using various fading channels. The work is done on Rayleigh and Nakagami-m fading channel. Implementation of the DS CDMA system is carried out by using various modules such as PN sequence generator, BPSK modulation and the fading channels. At the receiver side, Rake receiver is implemented to analyze the effect on the BER of the system. By varying the multipath component for the fading channels, Nakagami factor ‘m’ for Nakagami fading channel is also varied to observe the changes in the performance of the system. The MATLAB code is used for simulation to obtain the results.

Keywords: DS-CDMA, BER, SNR, Rake receiver, Multipath Fading Channel. MATLAB.

1. INTRODUCTION:

With the tremendous increment in the users count and introduction of new features including web browsing. In the past few years, the request for bandwidth has started to exceed the availability in wireless networks. Different techniques have been studied to improve the bandwidth, efficiency and increase the number of users that can be accommodated within each cell [1]. The International Telecommunication Union (ITU) likewise characterized recommendations for mobile communication framework for fourth era (4G). In these recommendations, information rates up to 100 Mbps for high portability and up to 1 Gbps for low versatility or nearby wireless are anticipated. Frameworks satisfying these prerequisites are typically considered as 4G frameworks. Existing multiple access techniques used in 1G/2G/3G systems (such as FDMA/TDMA/CDMA respectively) are basically suitable for voice communication only and unsuitable for high data rate transmission and burst data traffic which would be the dominant portion of traffic load in 4G system [1]. In present day communication framework Code-Division-Multiple –Access (CDMA) has had its effect in remote correspondence. It offers surely understood components, for example, dynamic channel sharing, delicate capacity, reuse variable of one, low dropout rate and expansive scope (because of delicate handover), ease of cell arranging, insusceptibility against obstruction and so on. These points of interest are accessible because of spreading the data over an extensive transmission capacity. The execution of regular CDMA framework is restricted by numerous get to obstruction multiple access interference (MAI) and in addition Inter Symbol Interference (ISI) [2]. Likewise, the intricacy of CDMA multiuser location has dependably been a genuine worry for extensive number of clients. A 4G framework is required to give a far comprehensive and secure all possible solution where offices, for example, IP communication, ultra-broadband web get to, gaming administrations and spilled media might be given to users [1][2].

CDMA is a well-known radio communication technique to allow multiple users to share the same spectrum simultaneously. Direct Sequence Code Division Multiple Access (DS-CDMA) is the most popular of CDMA techniques. The DS-CDMA transmitter multiplies each user’s signal by a distinct code waveform. The detector receives a signal composed of the sum of all users’ signals, which overlap in time and frequency. In a conventional

DS-CDMA system, a particular user's signal is detected by correlating the entire received signal with that user's code waveform.

1.1. Fading and multipath:

Fading refers to the distortion that a carrier-modulated telecommunication signal experiences over certain propagation media. In wireless systems, fading is due to multipath propagation and is sometimes referred to as multipath induced fading. To understand fading, it is essential to understand multipath. In wireless telecommunication, multipath is the propagation phenomenon that results in radio signals reaching the receiving antenna by two or more paths. Various causes of multipath include atmospheric ducting, ionospheric reflection and refraction, and reflection from terrestrial objects, such as mountains and buildings. These propagation mechanisms are responsible for multipath propagation which includes constructive and destructive interference and phase shifting of the signal. This distortion of signals caused by multipath is known as fading. In other words it can be said that in real world, multipath occurs when there is more than one path available for radio propagation. The phenomenon of reflection, diffraction and scattering all give rise to additional radio propagation path beyond the direct LOS (Line of Sight) path between the radio transmitter and receiver.

A fading channel is communication channel which has to face different fading phenomenon during signal transmission. In real world environment, the radio propagation effects combine together and multipath is generated by this fading channels. Due to multiple signal propagation paths, multiple signals will be received by receiver and actual received signal level is the vector sum of all the signals. These signals are impinging from any direction or angle of arrival; some signal aid the direct path and some others subtract it[3].

There are many models that describe the phenomenon of small scale fading. Out of these models, Rayleigh fading, Rician fading, AWGN and Nakagami fading models are most widely used.

1.1. Rake receiver

Rake receiver is one of the receiver technique, consists of multiple correlators, in which the receive signal is multiplied by time-shifted versions of a locally generated code sequence. To maximize the SNR and minimize the BER the CDMA Rake receiver is used.

A rake receiver is a radio receiver designed to counter the effects of multipath fading. It does this by using several "sub-receivers" called fingers, that is, several correlators each assigned to a different multipath component. Each finger independently decodes a single multipath component; at a later stage the contribution of all fingers are combined in order to make the most use of the different transmission characteristics of each transmission path. This could very well result in higher signal-to-noise ratio (or E_b/N_o) in a multipath environment than in a "clean" environment.

The multipath channel through which a radio wave transmits can be viewed as transmitting the original (line of sight) wave pulse through a number of multipath components. Multipath components are delayed copies of the original transmitted wave travelling through a different echo path, each with a different magnitude and time-of-arrival at the receiver. Since each component contains the original information, if the magnitude and time-of-arrival (phase) of each component is computed at the receiver (through a process called channel estimation), then all the components can be added coherently to improve the information reliability. Rake receiver figure is as shown in figure 1.1.

A rake receiver utilizes multiple correlators to separately detect M strongest multipath components. Each correlator may be quantized using 1, 2, 3 or 4 bits. The outputs of each correlator are weighted to provide better estimate of the transmitted signal than is provided by a single component. Demodulation and bit decisions are then based on the weighted outputs of the M correlators. Each correlator detects a time-shifted version of the original CDMA transmission, and each finger of the RAKE correlates to a portion of the signal, which is delayed by at least one chip in time from the other fingers

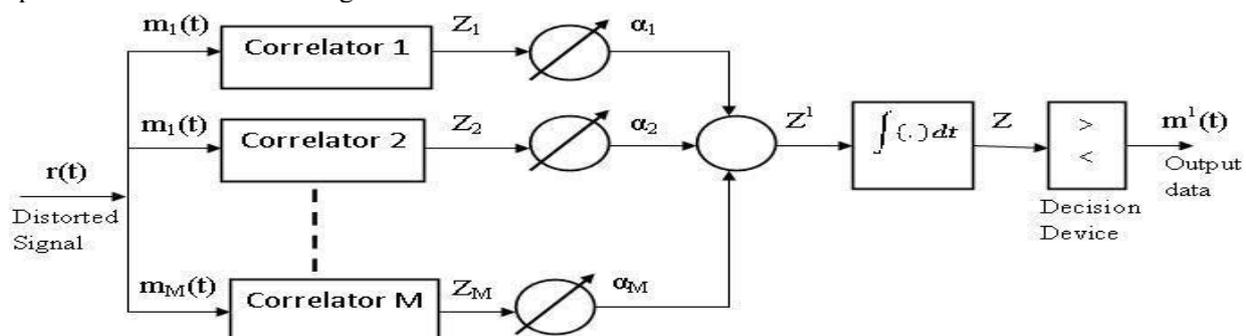


Figure 1.1 Rake Receiver

Assume M correlators are used in a CDMA receiver to capture M strongest multipath components. A weighting network is used to provide a linear combination of the correlator output for bit decision. Correlator 1 is

synchronized to the strongest multipath m_1 . Multipath component m_2 arrived t_1 later than m_1 but has low correlation with m_1 . The M decision statistics are weighted to form an overall decision statistic as shown in Figure 3. The outputs of the M correlators are denoted as Z_1, Z_2, \dots , and Z_m . They are weighted by $\alpha_1, \alpha_2, \dots$, and α_m , respectively. The weighting coefficients are based on the power or the SNR from each correlator output. If the power or SNR is small out of a particular correlator, it will be assigned a small weighting factor. If maximal-ratio combining is used, equation 1 can be written for Z' .

$$Z' = \sum_{m=1}^M \alpha_m Z_m \quad (1)$$

The weighting coefficients, α_m , are normalized to the output signal power of the correlator in such a way that the coefficients sum to unity, as shown in equation 3. As in the case of adaptive equalizers and diversity combining, there are many ways to generate the weighting coefficients. However, due to Multiple Access Interference (MAI), RAKE fingers with strong

$$\alpha_m = \frac{Z_m^2}{\sum_{m=1}^M Z_m^2} \quad (2)$$

Multipath amplitudes will not necessarily provide strong output after correlation. Choosing weighting coefficients based on the actual outputs of the correlator yields better RAKE performance [3] [4][5].

2. LITERATURE REVIEW:

A. Sudhir Babu and Dr.K.V.Sambasirao in their paper, "Evaluation of BER for AWGN, Rayleigh and Rician presumed that from the reenactment comes about that the BER of computerized correspondence framework is a critical figure of legitimacy used to evaluate the trust worthiness of information transmitted through the framework. By implementing the different modulation techniques, the standard is examination of variation of BER for various SNR. It is observed that the BER is least for AWGN and most extreme for Rayleigh and Rician [6].

George P. Efthymoglou and Henry Helmken in their paper, "Performance Analysis of Coherent DS-CDMA Systems in a Nakagami Fading Channel with Arbitrary Parameters" concluded the results which indicates that in the presence of multipath fading, the effect of non-identical Nakagami fading cannot be ignored in the performance analysis of a DS-CDMA system. For the self-assertive Nakagami blurring parameters we have considered within the sight of differing qualities, we can't compare any of these with various ways with indistinguishable blurring parameters[7].

Sidratul Moontaha, Farhana Akter, A K M Nazrul Islam, Farhana Rahman composed paper "BER Performance of DS-CDMA System over a Multipath Rayleigh Fading Channel Considering Path Gain Component and Noise Variance". In this paper, we have attempted to diminish the bit blunder rate of an uplink (switch connect) DS-CDMA framework. For this reason, recurrence specific and multipath Rayleigh blurring channel with power control utilizing standard Gaussian estimate (SGA) has been considered. Here, the way pick up segment has been viewed as Rayleigh appropriation. The final observation of our simulation is that the BER performance of DS-CDMA system is highly influenced by this path gain component and noise variance. This work can be further extended considering path gain component and other parameters in multicarrier direct sequence CDMA (MC-DS-CDMA) and orthogonal frequency division multiplexing (OFDM). By studying all the above papers, we can have the performance of communication system for various parameters like BER, various fading channels, modulation techniques [8].

3. MATERIALS:

A signal can travel from transmitter to receiver over multipath reflective paths in wireless mobile communication system. This sensation is referred to as multipath propagation. The distortion caused due to multipath propagation system is referring as fading. Hence, due to this fading problem we received the signals at the receiver with multiple copies. At the receiver side this leads to increase the Bit error rate (BER) of the system which increases the noise power. This system presents analytical expressions to evaluate the mean BER of Direct Spread Code Division Multiple Access(DS-CDMA)systems. The performance of the DS CDMA is observed under Rayleigh fading channel and Nakagami-m fading channel. By varying various parameters such as Nakagami factor, shape factor and multipath number the performance analysis is carried out[9]. Also rake receiver system is used at the receiver side and analyzes the effect on the BER of the system. Basically, Rake receiver is one of the frequently used techniques to overcome the effects of fading. It uses multiple correlators which are assigned for each multipath component and at the end the summation of the signals is carried out to increase the SNR ratio.

4. METHOD:

The system overview for BER improvement of DS-CDMA with Rake receiver using Multipath fading channel is as shown in figure 4.1. At the transmitter, the information is encoded using codes. The encoded information is then transformed into a data modulated symbol sequence with a baseband modulator. The modulated symbol sequence is spread in time domain by a chip sequence of PN code generator. The information is shaped and passed through a

channel for transmission. At the receiver, the information is multiplied with the chip sequence by the correlators in the rake receiver. The information is then summed and multiplied by local generated spreading code, which is despreading in time domain.. The information is demodulated and decoded and original data can be recovered.

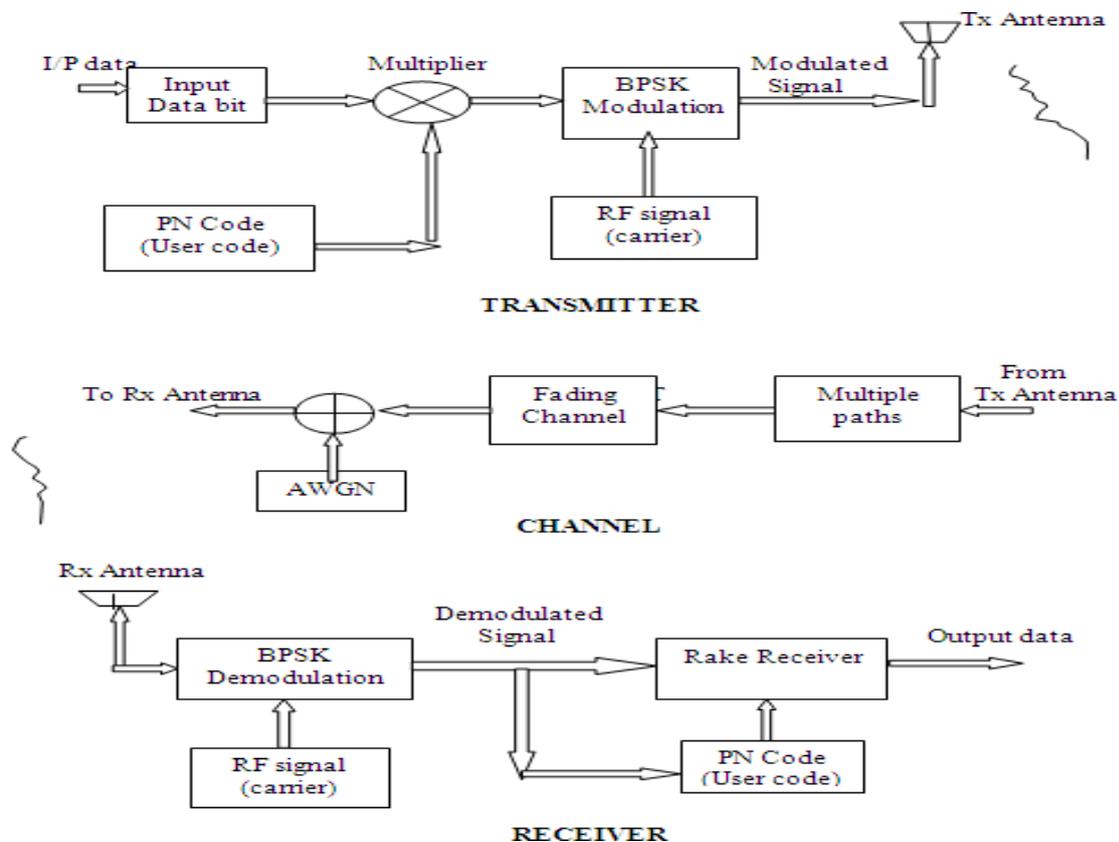


Figure 4.1: System Overview

5. DISCUSSION:

In this paper, analysis of the DS CDMA system with BER and SNR parameters for Rayleigh and Nakagami-m fading channel will be discussed and analyze for the reduced effective error rate in multipath fading channel. The work focuses on the performance comparison of the systems for Rayleigh and Nakagami fading channel by comparing the parameters like BER and SNR.

6. ANALYSIS:

BER (Bit Error Rate)

The number of bit errors per unit time is called as the bit error rate (BER). The bit error ratio is defined as the ratio of the number of bit errors to the total number of transferred bits during a premeditated time interval. BER factor is a unit less but it can be often expressed as a percentage [10].

$$BER = \frac{\text{Numbers of errors}}{\text{Total numbers of bits sent}} \quad (3)$$

End to end performance measurements by means of digital communication over radio channel is measured by BER.

$$BER = \text{Errors} / \text{Total number of bits}$$

BER Expression of Wireless System

$$BER = \frac{1}{2} * \left(1 - \sqrt{\frac{SNR}{2 + SNR}} \right)$$

$$BER \cong \frac{1}{2 SNR} \quad (4)$$

BER Expression of Wired System

$$BER = Q(\sqrt{SNR})$$

$$Q(\sqrt{x}) \cong e^{-\frac{x}{2}}$$

$$BER = e^{-SNR/2} \quad (5)$$

The BER performance of wired communication system decreasing exponential than wireless communication system as shown in figure 6.1.

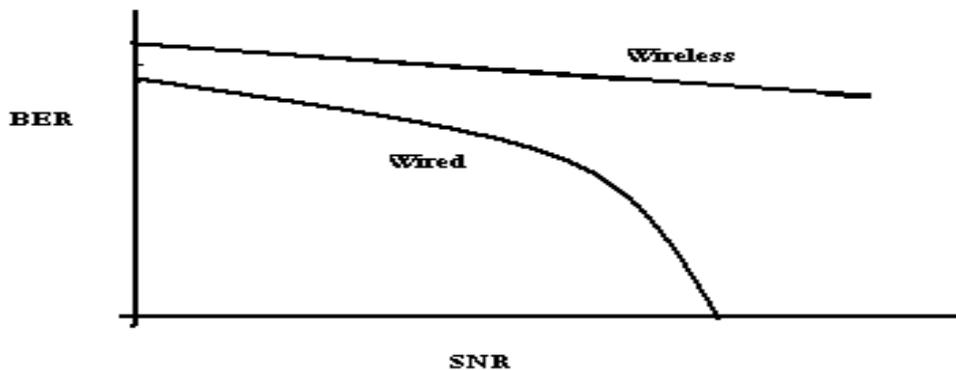


Figure 6.1: BER graph for wired and wireless communication.

SNR (Signal to Noise Ratio)

SNR is given as the ratio of signal power to the noise power in digital communication system and it is expressed in decibels unit. If the SNR ratio greater than 0 dB indicates more signal than noise. To evaluate the quality of communication link SNR is used as indicator. Well SNR and BER are inversely proportional to each other. Hence, greater value of SNR means lower value of BER which means good quality of communication system.

The parameters such as signal-to-noise ratio, the bandwidth, and the channel capacity of a communication channel are connected by the Shannon Hartley theorem and represented by following equation:

$$SNR = \frac{P_{signal}}{P_{noise}} = \frac{V_{rms}^2}{V_{qn}^2} \quad (6)$$

Simulating BER vs SNR in MATLAB:

The MATLAB code can be categorized into three stages: transmission, channel and receiver and in each stage, a certain portion of the communication link will be simulated. Firstly, the generation of the data sequence is done and modulation process is applied for the transmitting purpose. Next, noise will be added to the signal as it was transmitted through the non -ideal channel. Finally, we will simulate the necessary steps to equalize, demodulate, and decode the signal and calculate the bit error rate and SNR for both the channels i.e. Rayleigh and Nakagami channel. At last comparison is carried out by varying different values of the system between these two fading channel to find out the most efficient system. The following modules are used to implement the DS-CDMA system for BER analysis.

TRANSMITTER: Random bit sequence,BPSK Modulation ,PN sequence code.

CHANNEL: AWGN channel, Rayleigh Fading Channel, Nakagami-m fading Channel.

RECEIVER: BPSK Demodulator, PN sequence to decode, Rake receiver.

For the analysis of the proposed system following steps will be carried out:

- Random BPSK signals will be generated and passed through the AWGN channel, Nakagami channel, and Rayleigh channel.
- Received signal is demodulated.
- Numbers of errors will be counted.
- For Nakagami channel by varying M factor number of BER values can be obtained.
- Result will be plotted.

7. FINDINGS:

The BER values for different SNR values for AWGN, Nakagami-m and Rayleigh fading channel without using Rake receiver for data bit samples N=1000 is given in table7.1. The performance for Rayleigh channel is worst as compared to other fading channels. Table 7.2 shows the BER values for different SNR v alues with Rayleigh and Nakagami-m fading channel using rake receiver for data bit samples N=1000. It is observed that performance of Rayleigh fading channel is good as compared to Nakagami-m fading channel in terms of BER.

SNR Values (dB)	BER Rayleigh channel	BER AWGN Channel	BER Nakagami channel (m=10)
1	0.5030	0.2700	0.0750
2	0.4960	0.2530	0.0600
3	0.4980	0.2220	0.0370
4	0.4990	0.1950	0.0300
5	0.5200	0.1940	0.0100
6	0.5020	0.1500	0.0060
7	0.4740	0.1190	0.0020
8	0.4860	0.0950	0.0020
9	0.5040	0.0660	0.0000
10	0.4700	0.0460	0.0000
11	0.5150	0.0370	0.0000

Table 7.1: Different values of BER for SNR values for various channels without rake receiver

SNR Values (dB)	BER Rayleigh channel	BER Nakagami channel (m=10)
0	0.4682	0.5017
1	0.4610	0.5016
2	0.4599	0.4987
3	0.4489	0.5003
4	0.4512	0.5009
5	0.4525	0.4926
6	0.4425	0.5005
7	0.4328	0.5000
8	0.4260	0.4924
9	0.4154	0.4967
10	0.4172	0.4999

Table 7.2: Different values of BER for SNR values for various channels with rake receiver

8. RESULTS:

The BER versus SNR plot as shown in figure 8.1 for the Nakagami-m fading channel without Rake receiver, with the parameters $W=20$, $N=1000$, $m=10$. Here N is the data bits, W is the spreading factor, m = Nakagami factor. The BER value decreases with increase in SNR which is good for healthy communication. Diverse estimations of BER will be watched for Nakagami channel by shifting m-factor .By increasing the value of m the BER is decreases. For small value of m spikes are generated in the signal. The BER versus SNR plot is as shown in figure 8.2 for AWGN channel without Rake receiver, with the parameter $N=1000$. The performance of AWGN is not good as compared to Nakagami-m fading channel if the BER values are observed.

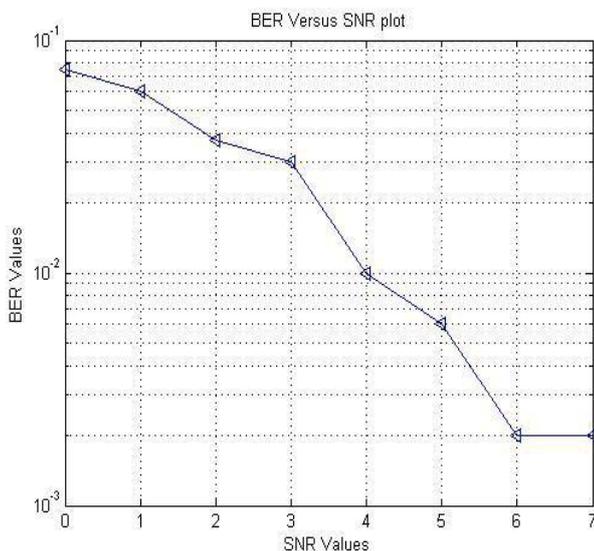


Figure 8.1: BER versus SNR plot for Nakagami-m fading channel ($N=1000$ $w=20$, $m=10$)

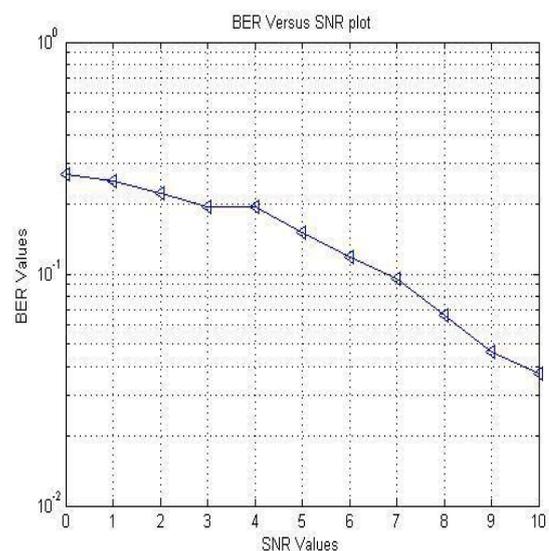


Figure 8.2: BER versus SNR for AWGN channel without rake receiver ($N=1000$)

The BER versus SNR plot is as shown in figure 8.3 for the Rayleigh fading channel without Rake receiver, with the parameters $N=1000$, multipath factor $=5$. Here N is the data bits. The performance of Rayleigh fading is bad as compared to Nakagami-m and AWGN channel i.e. BER values are more for Rayleigh channel.

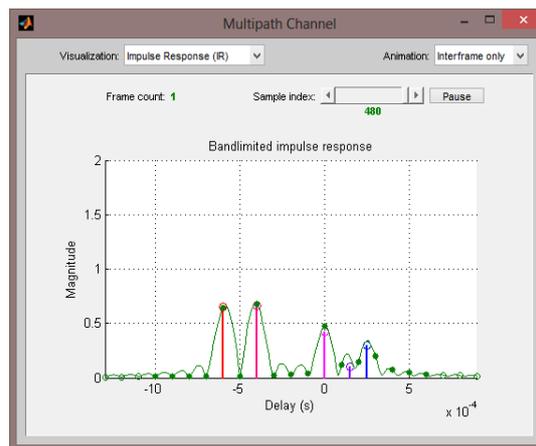
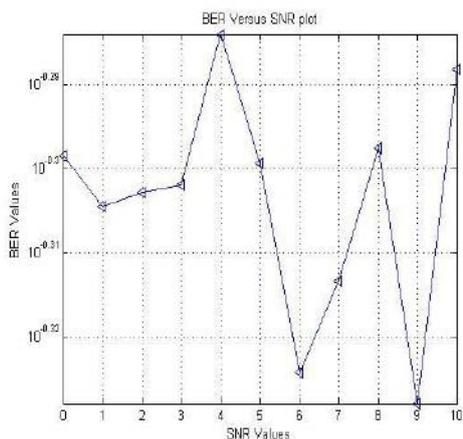


Figure 8.3: BER versus SNR for Rayleigh channel without Rake receiver (N=1000, Multipath factor=5)

Figure 8.4: Multipath channel response for Rayleigh

The figure 8.4 shows the Bandlimited Response for Rayleigh fading channel by using five multipaths. This plot shows the magnitudes of two impulse responses: the multipath response (infinite bandwidth) and the band limited channel response. The multipath response is represented by stems, each corresponding to one multipath component. The component with the largest delay value is shown in blue and the component with the smallest delay value is shown in red. Intermediate components delay values are shades between red and blue, becoming bluer for larger delay.

The bandlimited channel response is represented by the green curve. This response is the result of convolving the multipath impulse response, described above, with a sinc pulse of period, T, equal to the input signal's sample period.

The solid green circle represent the channel filter response sampled at rate 1/T. The output of the channel filter is the convolution of the input signal (sampled at rate 1/T) with this discrete-time FIR channel filter response. For computational speed, the response is truncated.

The hollow green circles represent sample values not captured in the channel filter response that is used for processing the input signal.

Note that these impulses vary over time. You can use the slider to visualize how the impulse response changes over time for current frame (i.e. input signal vector over time).

The BER versus SNR plot as shown in figure 8.5 for the Nakagami-m fading channel with Rake receiver, with the parameters W=3, N=1000, m=1. Here N is the data bits, W is the spreading factor, m= Nakagami factor. The performance is good for Nakagami fading channel as compared to Rayleigh channel. The BER versus SNR plot as shown in figure 8.6 for the Nakagami-m fading channel with Rake receiver, with the parameters w=20, N=1000, m=10. Here N is the data bits, W is the spreading factor, m= Nakagami factor. By increasing m values BER goes on decreasing.

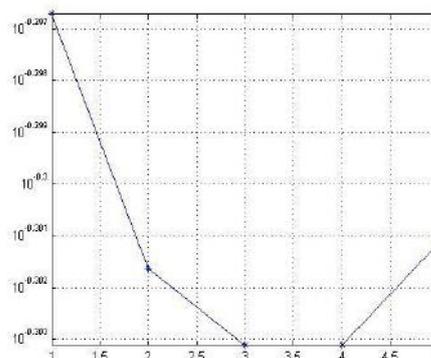
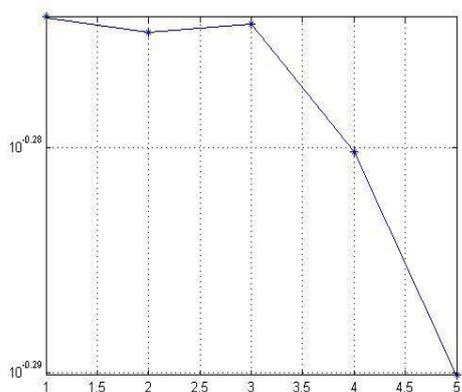


Figure 8.5 BER versus SNR for Nakagami-m fading channel with rake receiver (N=1000, W=3, m=1)

Figure 8.6: BER versus SNR for Nakagami-m fading channel with rake receiver (N=1000, W=20, m=10)

The BER versus SNR plot as shown in figure 8.7 for the Rayleigh fading channel with Rake receiver, with the parameters $N=1000$, multipath factor $=5$. Here N is the data bits. BER values are high for Rayleigh channel as compared to other channel like AWGN & Nakagami -m.

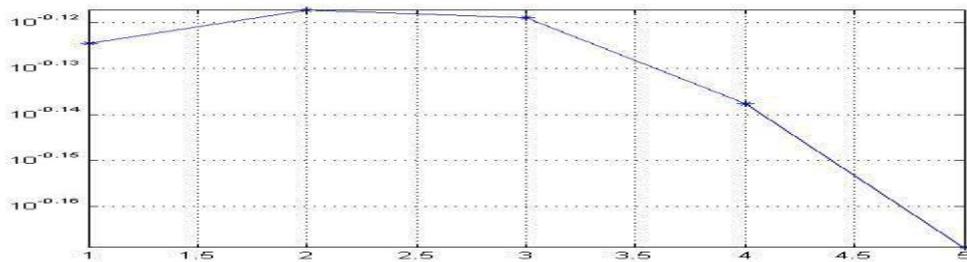


Figure 8.7: BER versus SNR plot for Rayleigh fading channel with rake receiver ($N=1000$, Multipath factor= 5)

9. RECOMMENDATIONS:

Compare BER for different sequences such as Hadamard, Gold sequence generator and Kasami with various channel such as AWGN, Rayleigh fading and Rician fading. Observe BER performance for various modulation scheme such as quadrature phase shift keying (QPSK) and quadrature amplitude modulation (QAM). Also as modulation scheme changes BER performance varies.

10. CONCLUSIONS:

We have implemented DS-CDMA system using BPSK modulation and PN sequence code in multipath fading channel with and without Rake receiver. The performance of the framework is compared at by utilizing the parameters like BER and SNR. We can improve the performance of wireless communication system with parameters BER, SNR for various fading channels and different modulation techniques. For better productive framework the BER ought to as little as would be prudent. The rake receiver is utilized to diminish the BER because of multipath impedance over channels utilized. The framework demonstrates that Nakagami-m channel is good as compared to both Rayleigh and AWGN channel without Rake receiver. The execution of framework is better for AWGN channel when contrasted with Rayleigh channel without rake receiver. Also, we have implemented DS-CDMA system under Rake receiver environment using PN sequence code with random noise signals; it is observed that performance of Rayleigh channel is good as compared to Nakagami-m fading channel in terms of BER.

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**‘Sanjyot-2018’ National Seminar on
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Digital Watermarking

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Abstract: Digital watermarking methods describe the technologies that allow hiding of information in digital media such as images, video and audio. Watermarking techniques embed information in images by introducing changes that are imperceptible to the human eye but recoverable by a computer program. Generally, the watermark is a code to identify the owner of the image. The locations in which the watermark is embedded are determined by a secret key. Doing so prevents possible pirates from easily removing the watermark. Furthermore it should be possible to recover the watermark from an altered image. Possible alterations of watermarked images include compression, filtering and cropping. These alterations are referred to as attacks. The first watermarking application that might come to mind is related to copyright protection of digital media. Watermarking algorithms have been proposed to protect varieties of content, such as official documents.

Key words: Compression, Cropping, Digital Watermark, Hiding, Secret key

1. INTRODUCTION:

A watermarking system must allow for a useful amount of information to be embedded into the image. Digital watermarking is the process of embedding information into digital multimedia content such that the information (which we call the watermark) can later be extracted or detected for a variety of purposes including copy prevention and control. Digital watermarking has become an active and important area of research, development and commercialization of watermarking techniques is being deemed essential to help address some of the challenges faced by the rapid proliferation of digital content.

The process of digital watermarking involves the modification of the original multimedia data to embed a watermark containing key information such as authentication or copyright codes. The embedding method must leave the original data perceptually unchanged. The major technical challenge is to design a highly robust digital watermarking technique, which discourages copyright infringement by making the process of watermarking removal tedious and costly. [12]A watermarking algorithm consists of the watermark structure, an embedding algorithm, and an extraction, or a detection algorithm. In multimedia applications embedded watermarks should be invisible, robust and have a high capacity. Invisibility refers to the degree of distortion introduced by the watermark. The literature survey explains robustness is the resistance of an embedded watermark against intentional attacks such as noise. Capacity is the amount of data that can be represented by an embedded watermark.

BLOCK DIAGRAM

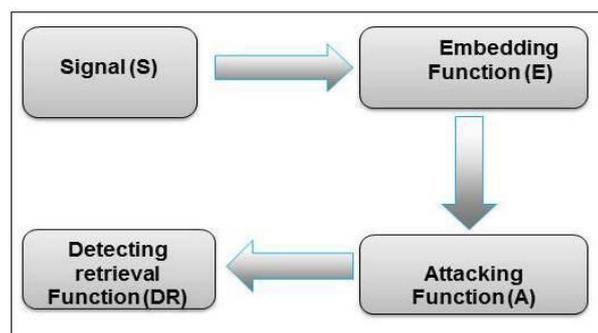


Fig.1 Basic Watermarking Procedure

Digital watermarking is one of the proposed solutions for copyright protection of multimedia data. This technique is better than Digital Signatures and other methods because it does not increase overhead. In this paper plan to present a new image watermarking technique that can embed more number of watermark bits in the cover image without affecting the imperceptibility and increase the security of watermarks. Digital watermarking is the process of embedding information into a digital signal in a way that is difficult to remove. The signal may be audio, pictures or video. In this paper image is the host signal and embedding the secret data and the extract the same. In this process enhancing the network security. [7]

2. DIGITAL WATERMARKING FOR COLOUR IMAGE

Multi-level Wavelet Decomposition of Image:

Fig. 2 is a schematic diagram of three-level DWT decomposition [4]. In the wavelet transform domain, high frequency part represent details information as image's edge, contour and texture and so on. Embedding watermarking in these places, people are not easily conscious of it. But after processing or attacking, it has poor stability.

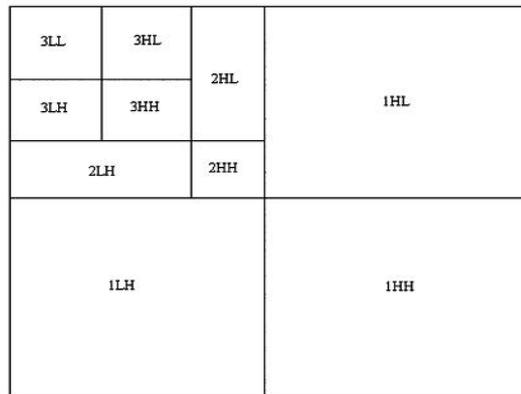


Fig.2 Three-level DWT decomposition

In Matlab, the realization of two-dimensional multi-level DWT decomposition of image is the function Wavedec2 (). Its form of call syntax is:

$$[C,S]=\text{Wavedec2}(\text{matrix of image}, N, \text{typename}) \quad (1)$$

For example, the image described with matrix A takes three-level DWT decomposition (N=3) by haar wavelet (wavelet type called haar). The expression of decomposition is as follows:

$$[C, S]=\text{Wavedec2}(A, 3, \text{haar}) \quad (2)$$

The wavelet coefficients after decomposition are all stored in a one-dimensional row vector C. Every coefficient of wavelet sub graph is ordered in row vector C. Its form is as follows:

$$C=[LL_N, HL_N, LH_N, HH_N, HL_{N-1}, LH_{N-1}, HH_{N-1}, \dots, HL_1, LH_1, HH_1]$$

In it LL_N, HL_N, LH_N, HH_N is row vector listed in the order of priority of separately the N level low-frequency sub graph, detail sub graph of horizon, vertical and diagonal directions.

The other $HL_i, LH_i, HH_i, (i=1, 2, \dots, N-1)$ is row vector listed in the order of priority of separately the i level detail sub graph of horizon, vertical and diagonal directions. The vector C and S after wavelet decomposition can be reconstructed with two-dimensional inverse DWT function Waverec2 (). For example, the formula corresponding to Eq.2 of initial image reconstructed by wavelet coefficients is as follows:

$$A'=\text{Waverec2}(C', S', \text{haar}) \quad (3)$$

When the right coefficients C' and S' of Eq. 3 are same with the coefficients C and S of Eq.2 the image A' reconstructed by Eq.3 is same with the initial image A by decomposition Eq.2.

3. EMBEDDING ALGORITHM OF DIGITAL WATERMARKING

The embedding steps are as follows:

Step 1: Chaotic encryption algorithm is used to robust watermarking.

Step2: Use Arnold transformation to transform fragile watermarking, and then encrypt it with RSA public key encryption algorithm.

Step3: Use step 2 to switch initial image's room.

Step4: Use DWT to switch Y component in YCbCr domain. Information embedded is less as decomposition levels of DWT get more. So use four-level DWT to Y component in this paper, and then embed robust watermarking by chaotic encryption in the intermediate frequency coefficients and fragile watermarking in high frequency coefficients of CbCr.

Step5: Use IDWT to switch Y component. Switch YCbCr room to RGB room. Then get color image embedded with watermarking.

EXTRACTION ALGORITHM OF DIGITAL WATERMARKING

Extraction of watermarking is inverse process of embedding.

The flow chart of algorithm is as follows:

Its steps are as follows:

Step 1: Switch the room of image which watermarking is embedded. Y component, Cb component and Cr component can be got.

Step2: Take four-level DWT to Y. Extract watermarking with secret key in its intermediate frequency coefficients. Then take chaotic decryption to get robust watermarking. Because the fragile watermarking is encrypted by owner's private secret key, all users can use the public key to decrypt. They can get the watermarking information and then verify it. The fragile watermarking can be got by decrypting high frequency coefficients of Cb and Cr components [11].

4. RESULTS

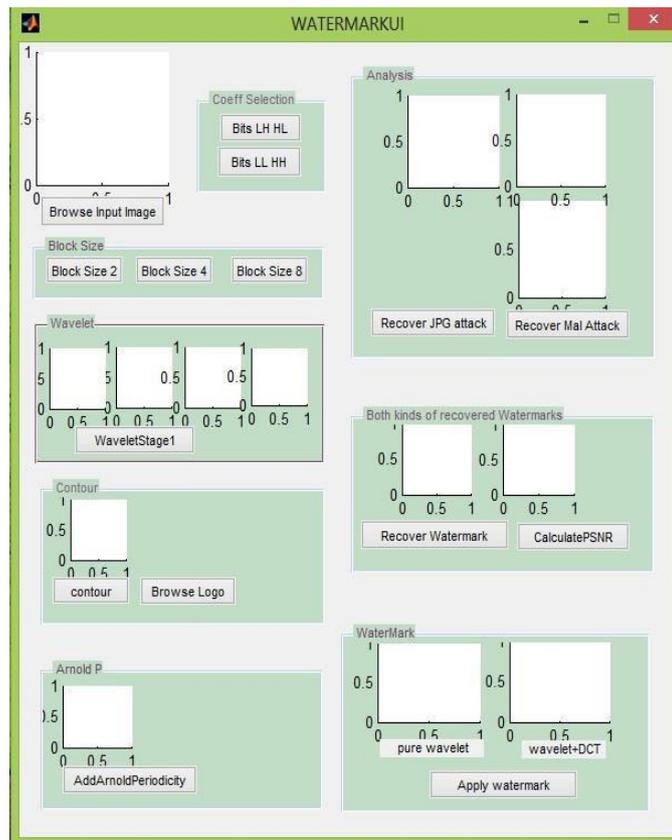


Table1.PSNRWithDifferentImages

Image	PSNR with JPG Attack	PSNR with MAL Attack	PSNR
Lena	44.7707	58.7355	48.0026
Rice	42.7809	59.7543	48.0091

5. CONCLUSION:

In this paper a new frequency domain algorithm for color digital image watermarking is presented, this algorithm uses the green channel for watermarking embedding. From result we can conclude that the signal to noise ratio with JPG attack is less as compared to MAL attack. By comparing our algorithm to others, we can conclude that the maximum numbers of bits that can be hidden and recovered successfully from the watermarked images have been increased. Excellent performance for the embedding process is achieved for an embedding stage. It has also been demonstrated that for this embedding strength the signature is immune to a variety of attacks, including filtering,

contrast balancing, compression, and geometrical transforms such as resizing. Image Adaptive Self Embedding Watermarking proved robust against various attacks performed. The use of semi-fragile property helps to detect the location of fraud in the image. This technique is having a great scope of opportunities; especially in the field of cyber frauds, court evidences and certificate or identity forgery and even in the preservation and transmission of cultural heritage images. The large need of networked multimedia system has created the need of *COPYRIGHT PROTECTION*. It is very important to protect intellectual properties of digital media. Internet playing an important role of digital data transfer. Digital watermarking is the great solution of the problem of how to protect copyright. Digital watermarking is the solution for the protection of legal rights of digital content owner and customer.

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**‘Sanjyot-2018’ National Seminar on
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A Survey for Minimizing the Communication Latency in Multicore Architecture

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Abstract: High-performance computing (HPC) is the use of parallel processing for running advanced application programs efficiently, reliably and quickly. The term applies especially to systems that function above a teraflop or 10^{12} floating-point operations per second. The term HPC is occasionally used as a synonym for supercomputing, although technically a supercomputer is a system that performs at or near the currently highest operational rate for computers. Some supercomputers work at more than a petaflop or 10^{15} floating-point operations per second. Parallel computing plays important role in achieving the high performance in many science and technological applications. Parallel computing has become the dominant paradigm in computer architecture, mainly in the form of multi-core processors. These Multicore architectures suffer from high core-to-core communication latency. Studies suggest that various methods and models are used to minimize the communication latency among the cores. Recent studies indicate that a directory-approach can be useful to decrease communication latency by storing the cached block information also a wireless router has potential to help decrease communication latency in multicore architectures. We survey various other designs and techniques to address the issues in minimizing the communication latency in multicore architectures

Keywords: Communication latency, multicore architecture.

1. INTRODUCTION:

High Performance Computing most generally refers to the practice of aggregating computing power in a way that delivers much higher performance than one could get out of a typical desktop computer or workstation in order to solve large problems in science, engineering, or business. The current and future applications of supercomputing are involved but surely not limited to in the area of Healthcare and Medicine, Modeling and simulation, Security, Fintech and Engineering, Materials and manufacturing industries. Below are five real-life applications of supercomputers that you never knew about until now.

- The Bitcoin marketplace Ever thought of supercomputing as a get-rich-quick strategy? Computer geeks do. It turns out that supercomputing processes are perfect for mining for Bitcoin. The mining community is now using dedicated mining machines built purely to mitigate Bitcoin hash-rate problems. Supercomputers are so well suited to this that they're now becoming essential for real financial success in the emerging online currency world.
- Automobile safety ratings Supercomputers play a very important role in helping people decide what car to buy. When auto manufacturers subject their vehicles to safety testing, only a fraction of the testing is done in a live, simulated environment with a dummy. In fact, a large portion of a vehicle's safety rating is based on complex computer-generated scenarios, where supercomputers crunch equations involving dozens upon dozens of different variables. These computer-generated scenarios, along with the data taken from the crash tests themselves, are analysed to determine safety ratings.
- The newspaper Journalists are finding key sources — in the form of supercomputers. The Associated Press and other major news organisations recently began using software that employs algorithms to spot facts and key trends in data, and describe them in a narrative way – effectively enhancing the journalist's ability to generate insights for data-centric stories such as earnings reports. The algorithms can comb through historical data for outlier cases, select appropriate words from a vast thesaurus, and apply what it considers to be the best ones to describe a situation. Voila – a news article is made.

- Smog control in cities By running meteorological data through high-power supercomputers, scientists can predict pollution levels in major cities like Beijing. These processes can help identify the source and dispersal pattern of pollutants across Beijing with a street-level degree of detail days in advance. Armed with this information, public health officials can warn at-risk individuals and potentially control the pollution's damaging effect on a community. The same insights can also help reduce pollution in the future by looking at energy consumption, predicting the effectiveness of alternative energy sources – such as solar and wind – or effectively managing energy production to minimise waste.
- 18-wheelers 18-wheeler trucks have begun appearing with “skirts” on the bottom. Research done by powerful supercomputers showed that this aerodynamic design reduces drag and increases efficiency enough that operators save up to \$5,000 per truck, per year in fuel costs. Imagine, then, the impact this will have on the \$603.9 billion worth of freight these trucks transport each year across the US. All because of research done on a supercomputer, people could be looking at saving money on everything from their Weetabix to their wearables.

As all this applications and other applications too are greatly involved with high operating and manipulating the Big Data. Parallel processing or concurrent execution is the key to operate this data efficiently and effectively Every large scale organizations handling tremendous amount of Big Data. Like Facebook, Yahoo, Google and others.. Parallel computing using Multicore system can plays important role in processing the Big Data at these organizations.

Parallel computing is a type of computation in which many calculations or the execution of processes are carried out simultaneously. Large problems can often be divided into smaller ones, which can then be solved at the same time. There are several different forms of parallel computing: bit-level, instruction-level, data, and task parallelism. Parallelism has been employed for many years, mainly in high-performance computing, but interest in it has grown lately due to the physical constraints preventing frequency scaling. As power consumption (and consequently heat generation) by computers has become a concern in recent years, parallel computing has become the dominant paradigm in computer architecture, mainly in the form of multi-core processors.

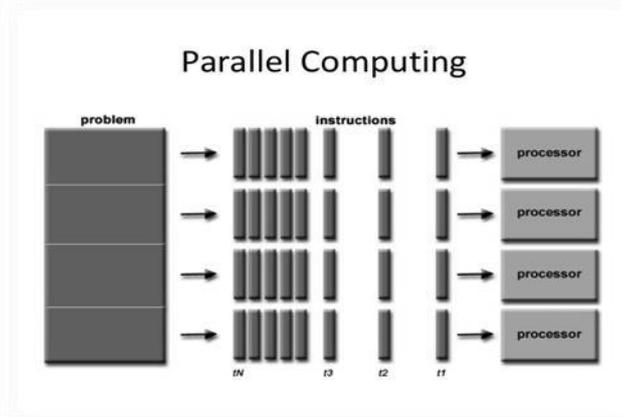


Fig. 1. Overview of Parallel Computing

Parallel computing is closely related to concurrent computing—they are frequently used together, and often conflated, though the two are distinct: it is possible to have parallelism without concurrency (such as bit-level parallelism), and concurrency without parallelism (such as multitasking by time-sharing on a single-core CPU). As shown in Fig. 1. in parallel computing, a computational task is typically broken down in several, often many, very similar subtasks that can be processed independently and whose results are combined afterwards, upon completion. In contrast, in concurrent computing, the various processes often do not address related tasks; when they do, as is typical in distributed computing, the separate tasks may have a varied nature and often require some inter-process communication during execution.

Parallel computers can be roughly classified according to the level at which the hardware supports parallelism, with multi-core and multi-processor computers having multiple processing elements within a single machine, while clusters, MPPs, and grids use multiple computers to work on the same task. Specialized parallel computer architectures are sometimes used alongside traditional processors, for accelerating specific tasks.

The rest of the paper is organized as follows. Section 2 summarized some related published articles. Section 3 explains about Multicore architecture. Section 4 discuss about various existing design for minimizing the communication latency in multicore system. The comparative analysis is given at last in the paper.

2. LITERATURE SURVEY:

This section provides an overview of interconnection topologies including mesh and WNoC which are suitable for multicore architectures. Stanford DASH multiprocessor architecture is also studied as we propose a directory based mechanism in this work.

A. Interconnection Network Topologies

Some popular network topologies (namely, bus, crossbar, ring, and torus) are depicted in Fig. 2

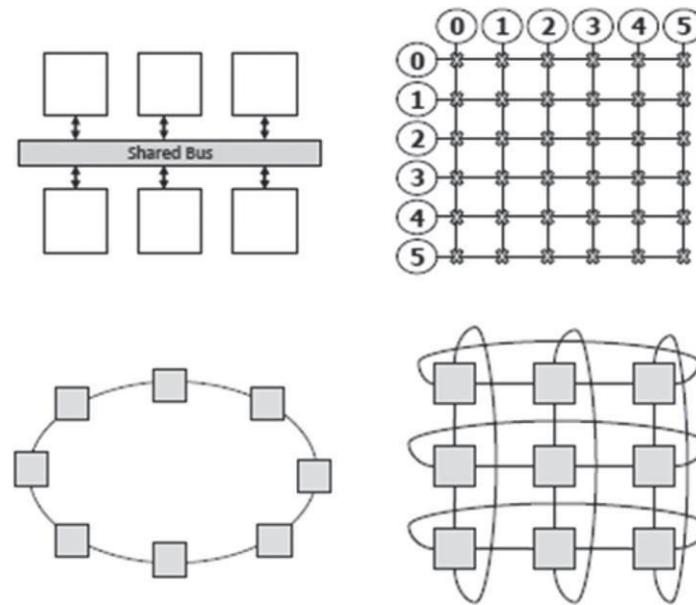


Fig. 2. Different popular interconnection network topologies.

The emphasis on designing new on-chip interconnection network topology is increasing as more and more cores have to be accommodated on a single chip. Using dedicated ad-hoc wires to connect cores and related components is an alternative for building an on-chip network. However, as the number of cores increases, the number of wires required to connect all the cores and components will become expensive. Moreover, scaling becomes a very significant problem along with massive power consumption. The length of the dedicated wires used to connect results in long latency.

B. N*N Mesh Network

Mesh (a simplified form of torus) is a potential network topology for multicore architectures. In a two dimensional (2D) mesh network, all cores are connected in a crossbar connection as shown in Fig. 3. Mesh network topology is the most common topology used, due to its advantages of shorter wavelength, low router complexity, and feasibility[1]. Wired mesh network provides very good reliability for inter-core communication. However, this topology has many disadvantages, such as network congestion, poor scalability, high power consumption, and long latency. There are many routing algorithms used by various topologies in order to reach the destination core.

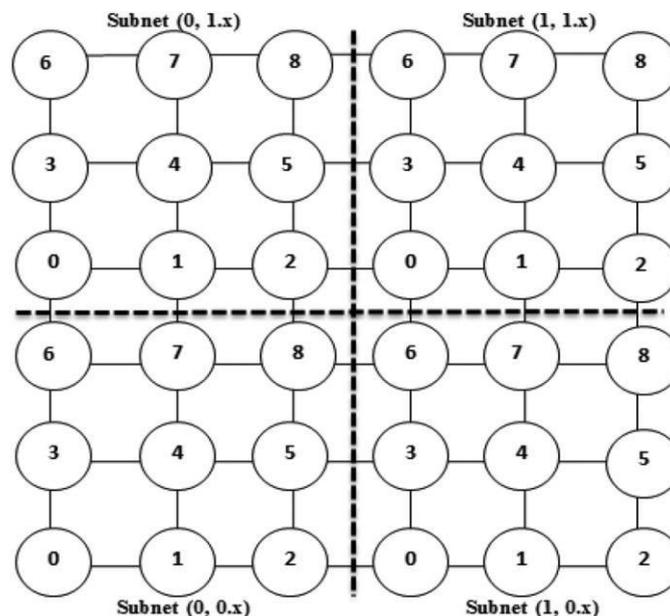


Fig. 3. Subnets in a mesh

C. Wireless Network On Chip

In a multicore CMP, NoC is considered as the most prominent technology providing a high degree of integration among the cores. The 2D floor plan limits the choice of NoC topology. Express channels are introduced to bridge the gap among the cores which are far apart [2], [3]. Proposed 3D NoCs has advantages from both 3D integrated circuits (ICs) and NoCs and it provides improvements in latency and power consumption [4].

An UWB NoC technology is proposed utilizing both wired signals and distributed medium access control (MAC) protocol [5]. The proposed architecture achieves a data transmission range of 1 mm with the antenna length of 2.98 mm and bandwidth achieves on a single channel was 10 Gbps. As the range of wireless radio frequency signals are in the range of GHz, and the sizes of transmitter, receiver, and antenna blocks have also reduced significantly. A scalable wireless interconnect technology is proposed to evaluate the feasibility of both hybrid wired and wireless platform by validating on-chip wireless communication [6]. This work provides a two-tier hybrid wired and wireless architecture platform to demonstrate the benefits of long-range wireless links.

D. WNoC Topology

The basic component in a WNoC architecture is a network based processor array (NePA). Each and every processing element (PE) consists of a processor core, network interface (NI), and a router. The architecture of a NePA is shown in Fig. 4. Each of these routers has two bidirectional 64-bit links connecting it with the neighboring routers and additionally they also have vertical ports. With the help of the links, two subnets can be formed – an East subnet and a West subnet, separating the whole network into two sub-networks. Fig. 5 shows the input and output ports of a NePA router

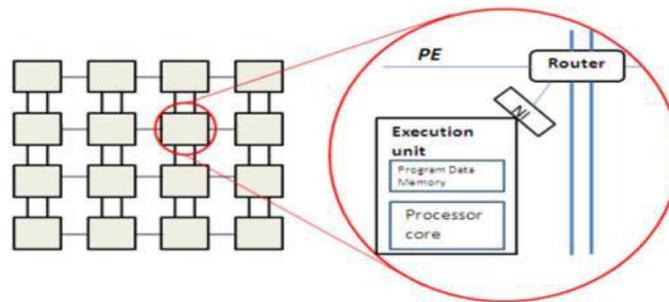


Fig. 4. A 4*4 2D NePA architecture

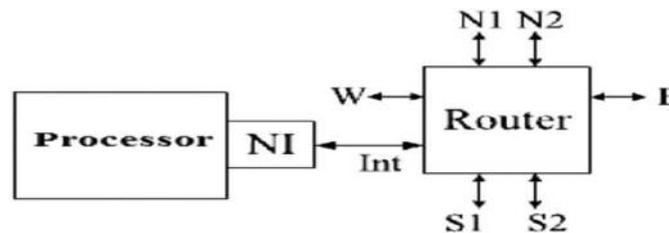


Fig. 5. NePA router port description

Whenever a packet is to be transmitted it is injected into the router via internal port (Int) and accordingly it is directed to destination by directing it towards either East-subnet or West-subnet. NePA utilizes an adaptive XY routing scheme to route the packet from source to destination. To balance the link utilization and improve network performance, the router selects an alternative output port for incoming packets. This process is useful, especially when the output port is congested. Wireless routers are capable of transferring packets via wired as well as wireless.

Some of the routers in WNoC are replaced with wireless routers which have wireless links to other routers in different subnets, in addition to the original wired links. Therefore, WNoC is capable of transferring packets through wired and wireless links. In WNoC, processing cores are divided into various subnets which have one wireless router responsible for providing wireless communication for the cores. Fig. 5 shows the architecture of a WNoC, where the cores are divided into four rectangular subnets and the wireless routers are placed in the middle (approximately) of each subnet. The dotted and curved lines represent the wireless links and the solid lines represent wired links among the processing cores to transmit the data packets between routers.

The frequency division multiple access (FDMA) technique is chosen to provide simultaneous communication among the multiple wireless routers. Transmitter and receivers installed on a wireless router are assigned with an independent carrier frequency to accommodate data from different channels. Wormhole packet switching, which offers many advantages such as lower transfer latency and a low buffer requirement, is used to transfer packets of data among the cores.

The whole network is divided into subnets and each and every node is identified within its subnet using a local address. The address has three components (as shown in Fig. 6) – subnet’s X value, subnet’s Y value, and a number for each node. Here, X 0, Y 0, the (X, Y) subnet specifies the subnet location in the network, and the node number identifies the processing core within the subnet. The features of addressing a specific core in a network help WNoC provide much faster routing decisions as well as a scalable hierarchical system.

E. DASH (Directory Architecture for Shared Memory) Multiprocessor

Stanford DASH architecture is considered in this work because of its directory-based cache coherence protocol and high scalability. The DASH system supports shared memory architecture inside a cluster of a small number of cores and the message passing technique among the clusters [7].

This architecture provides high processor performance by maintaining coherence among the caches of all the cores and also provides scalability of cores since it does not have any single control unit. DASH protocol does not rely on broadcast messages and instead uses point-to-point messages sent between processors and memories to keep caches consistent [8]. Fig. 7 shows the high level organization of a DASH system [9]. Typically, a DASH system may consist of a large number of processing nodes via an interconnection network which has large bandwidth and a low communication delay. The physical memory or the main memory is distributed among all the clusters in such a manner that the memory is accessible from each and every core.

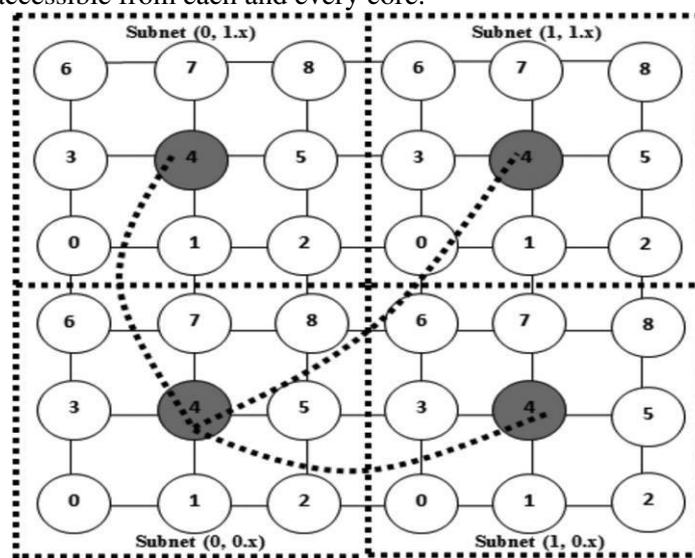


Fig. 6. Wireless network on-chip (WNoC) architecture

Each processing core has its own individual cache. In order to maintain cache consistency among the cores of a cluster a bus-based snoopy scheme is used and a distributed directory-based coherence protocol is used to maintain cache consistency among the clusters. In DASH architecture, shared memory provides a major reduction in the communication latency.

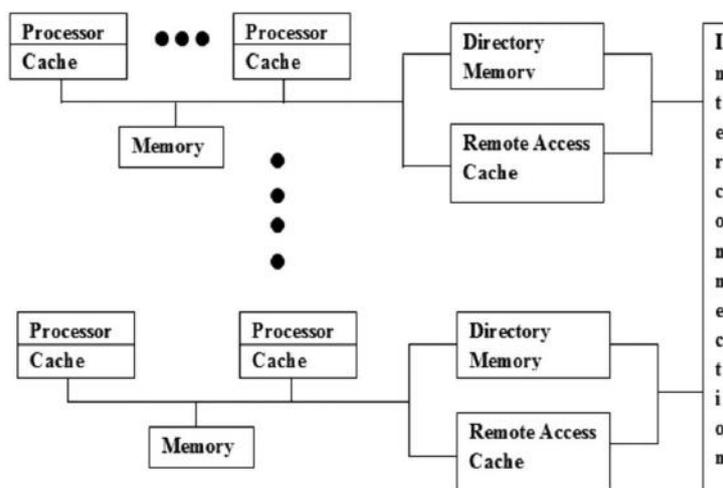


Fig. 7. A directory based DASH system

F. Directory Based Architecture

The Directory and Wireless routers architecture is a hybrid combination of the WNoC architecture and the DASH architecture. The major goal of the this multicore architecture is to reduce the communication latency among

the cores by decreasing the number of hops required to travel from a source core to a destination core using the directory and wireless routers. The key design considerations include: grouping cores, designing directory, managing cache consistency, and communication among cores

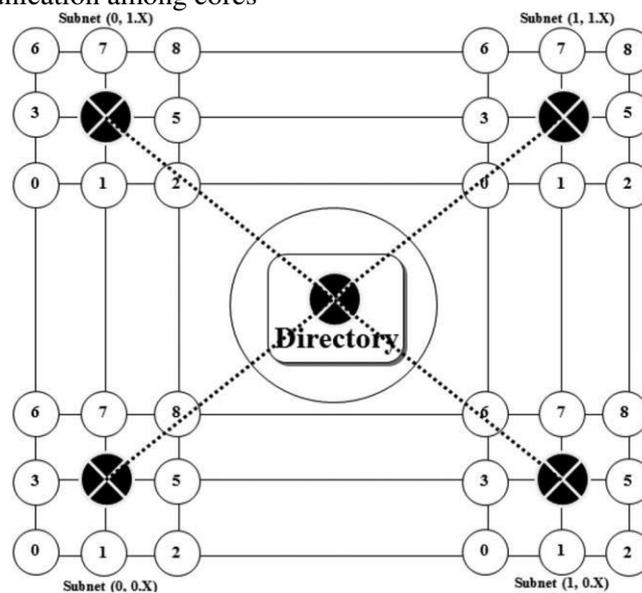


Fig. 8. Directory and wireless routers.

3. COMMUNICATION AMONG CORES IN MULTICORES SYSTEM:

G. Overview of Multicore processors

A multi-core processor is a single computing component with two or more independent processing units called cores, as shown in Fig. 9, which read and execute program instructions. The instructions are ordinary CPU instructions (such as add, move data, and branch) but the single processor can run multiple instructions on separate cores at the same time, increasing overall speed for programs amenable to parallel computing. Manufacturers typically integrate the cores onto a single integrated circuit die (known as a chip multiprocessor or CMP) or onto multiple dies in a single chip package.

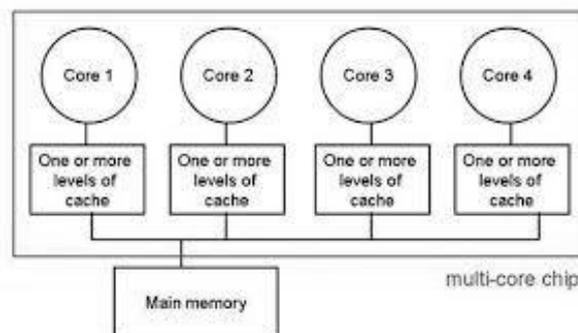


Fig. 9. Multicore Architecture

A multi-core processor implements multiprocessing in a single physical package. Designers may couple cores in a multi-core device tightly or loosely. For example, cores may or may not share caches, and they may implement message passing or shared-memory inter-core communication methods. Common network topologies to interconnect cores include bus, ring, two-dimensional mesh, and crossbar. Homogeneous multi-core systems include only identical cores; heterogeneous multi-core systems have cores that are not identical (e.g. big.LITTLE have heterogeneous cores that share the same instruction set, while AMD Accelerated Processing Units have cores that don't even share the same instruction set). Just as with single-processor systems, cores in multi-core systems may implement architectures such as VLIW, superscalar, vector, or multithreading.

Multi-core processors are widely used across many application domains, including general-purpose, embedded, network, digital signal processing (DSP), and graphics (GPU). The improvement in performance gained by the use of a multi-core processor depends very much on the software algorithms used and their implementation. In particular, possible gains are limited by the fraction of the software that can run in parallel simultaneously on multiple cores; this effect is described by Amdahl's law. In the best case, so-called embarrassingly parallel problems may realize speedup factors near the number of cores, or even more if the problem is split up enough to fit within each core's cache(s), avoiding use of much slower main-system memory. Most applications, however, are not accelerated so much unless

programmers invest a prohibitive amount of effort in re-factoring the whole problem. The parallelization of software is a significant ongoing topic of research.

A single-core processor is a microprocessor with a single core on a chip, running a single thread at any one time. The term became common after the emergence of multi-core processors (which have several independent processors on a single chip) to distinguish non-multi-core designs. For example, Intel released a Core 2 Solo and Core 2 Duo, and one would refer to the former as the 'single-core' variant. Most microprocessors prior to the multi-core era are single-core. The class of many-core processors follows on from multi-core, in a progression showing increasing parallelism over time.

Processors remained single-core until it was impossible to achieve performance gains from the increased clock speed and transistor count allowed by Moore's law (there were diminishing returns to increasing the depth of a pipeline, increasing CPU cache sizes, or adding execution units)

H. Communication among cores in Multicore systems

Multicore architectures suffer from high core-to-core communication latency primarily due to the cache's dynamic behavior. In order to provide improved performance to customers, design engineers have to change from building a single large complex core to many small simple cores on the computer chip [10], [11], [12], [13]. Multicore chips have become the most predominant components in building a computer, which can meet the demands of the present time and the evolution of these multicore processors has made a radical change in the way of designing computer systems.

Multicore systems are designed in a way that two or more cores are coupled together to work concurrently in parallel for increasing execution speed of complex jobs which need multiple operations to be done at a single instant of time. A large and/or complex job is divided into multiple tasks and the tasks are processed concurrently on many cores; this leads to multicore systems. In a multicore system, multitasking is done by assigning different sets of tasks to different cores. Multiple cores help improve the computational capacity of the processor through parallel computing technology [14]. While multicore processors have become certainly important, there are still many obstacles that designers have to face while designing more than one processing core on a chip. More cores were embedded on a single die which presents a need of interconnection between two cores and interconnection among the cores leads to long wiring delays, huge power consumption, and other challenges (some of those are discussed in this article). A wide changeover from single-core to multicore chip processors has pleased many users by providing increased performance and access to many applications which requires a very fast execution speed. Multiple cores on a chip lead to some interesting challenges, such as implementing multi-threading in order to provide better performance. Multi-threading is a process in which a central processing unit (CPU) can execute several number of threads simultaneously [15].

Simultaneous multithreading (SMT) is a technique in which several independent threads would issue instructions to a superscalar's multiple functional units in a single cycle [16]. Therefore, the advanced multicore chip multiprocessor (CMP) supports a number of cores (10 to 100 or more) on a chip. Examples on CMP include Tiler's 64-core TILE64 [17], Intel's 80-core TFLOPS [18], NVIDIA's 128-core Quadro GPU [19], 240-core Tesla C1060 GPU, and 2880-core Tesla K40 GPU [20]. With the evolution of multicore architectures, both simultaneous execution of instructions and better communication among the cores are given equal priority to provide outstanding performance. Coherence of cached data may be a major challenge as one large common memory is shared among many cores in a multicore architecture. There are various solutions to address multicore data inconsistency .

4. COMMUNICATION LATENCY:

Many multicore chip processor computers are capable of providing an adequate performance by implementing additional instruction level parallelism (ILP). ILP is implemented to keep cores productive as much as possible by executing several instructions at a time. This process requires access to memory in order to fetch data and store results. Therefore, many operations may be carried out on a particular memory location at a single instance of time. Data coherence mechanism ensures that the data fetched by a particular core is the most appropriate data. Each core on a multicore processor should be provided access to sufficient resources at any particular instant of time for a successful outcome. Also, some cores on the chip may depend on other cores because a number of execution units may require results computed by the other cores; therefore, inefficient communication among cores could result in a considerable delay in overall execution of some instructions [21]. With the implementation of additional parallelism and multithreading, efficient communication among cores on chip becomes central focus to achieve better performance [22]. In order to keep all the computing units (i.e., cores) active, these cores must be supplied with data at the instance of time when the data is requested, without any delay. Communication among cores can be viewed in two different perspectives: one is with respect to physical infrastructure (i.e., how cores communicate) and the other one is what is being transferred between the cores.

Designing of physical infrastructure deals with the resources and wiring, necessary to facilitate efficient transfer of the bits. There are many communication patterns that are proposed for efficient on-chip communication, but there are certain constraints to be considered, such as limited area, communication latency, and power consumption,

while pro-posing a mechanism for communication between cores on-chip . As more and more cores are tightly coupled in a multicore architecture, there is a necessity for the coupling of an efficient on-chip network with a proper design of coherence protocol which results in a synergistic relationship between the two. If two cores are placed on a single die instead of one, it should consume more power than that by a single core and generates large amount of heat. To combat unnecessary power consumption many designs incorporate a power control unit which has the authority to shut down unused cores and limits the consumption of power. In some proposed architectures, multiple cores are run at a very lower frequency to reduce power consumption

As we know, bus based multicore architecture is okay for small number of cores (say, 4-8). Usage of dedicated wires to directly connect cores on-chip is one solution to provide direct communication in a multicore architecture. However, the manufacturing of chips using dedicated wires is very expensive and would consume more power and space; this inefficiency resulted in a shift to on-chip networks and incorporating wireless communication among cores. Network-on-chip (NoC) provides a more scalable solution for the multicore architectures [22]. NoC architecture is a technology, proposed to overcome the problem of large communication delay among cores in a multicore architecture. It is proposed in order to design a communication subsystem between various modules such as core processors, memories, and special core blocks. Communication among these modules would be via multiple point-to-point links so that each and every block can reach any other module by switching over several links.

I. Photonic Networks-on-Chip for Future Generations of Chip Multiprocessors

Photonic NoC is a solution for high-performance CMP design which leverages the remarkable progress in silicon photonics to offer a major reduction in the power dissipated on intrachip communications. The intrachip photonic infrastructure also offers seamless offchip communications. Specifically, we propose a hybrid NoC microarchitecture that combines a photonic circuit-switched network with an electronic packet-switched network. In the span of three or four CMOS process generations, a similar photonic NoC will be implemented as an additional layer of optical and optoelectronic devices grown on top of the silicon die and the metal layers comprising the CMP and possibly with multiple memory planes in between. This will likely be realized using 3D Integration (3DI) based on through-silicon via technology in order to separately optimize logic, memory, and Si photonics planes. Further, current trends in multicore architectures suggest that CMPs will soon host a few dozen complex cores, each containing multiple logic blocks including one or more processing units, a local memory, a direct memory access (DMA) memory controller, and a network interface. The photonic NoC will be the global communication medium connecting these cores among themselves and with off-chip memories and devices [23].

Exploiting Photonics in NoC Design

The NoC is comprised of broadband 2×2 photonic switching elements (PSEs) interconnected by optical waveguides. The PSEs can switch wavelength parallel messages (i.e., each message is simultaneously encoded on several wavelengths) as a single unit, with a subnanosecond switching time. The switches are arranged as a 2D matrix and organized in groups of four. Each group is controlled by an electronic circuit termed electronic router (ER) to construct a 4×4 switch. This structure lends itself conveniently to the construction of planar 2D topologies such as a mesh or a torus. Two-dimensional topologies are the most suitable for the construction of the proposed hybrid microarchitecture. The same reasons that made them popular in electronic NoCs, namely, their appropriateness for handling a large variety of workloads and their good layout compatibility with a tiled CMP chip, still apply in the photonic case. Further, large radix switches are very difficult to construct using PSEs, so the low-radix switches, the building blocks of mesh/torus networks, are a better fit. A key advantage of photonic implementations of meshes and tori is related to the nature of the guided waves. When two waveguides intersect at a right angle, as they do many times in mesh and torus networks, the waves continue propagating in their original direction and the crosstalk is negligible. This property enables the construction of the photonic NoC in a single layer, above the metal stack, thus reducing the fabrication complexity, the chip dimensions, and the total cost. Torus networks offer a lower network diameter compared to meshes, at the expense of having longer links. Hence, they are a better choice for photonic NoCs since the transmission power on photonic links is independent of the length, unlike in copper lines. Topology can also be employed to address issues caused by the lack of buffering in photonics. Since the PSEs have small area and power consumption, many of them can be used to provision the network with additional paths on which circuits can be created, thus reducing the contention manifested as path setup latency.

J. CUWB-BASED ON-CHIP WIRELESS INTERCONNECTIONS

A revolutionary on-chip communication infrastructure based on RF interconnection, which name as Wireless Network-on Chip (WNoC) in contrast to NoC. WNoC will provide higher flexibility, higher bandwidth, reconfigurable integration, and freed-up wiring when compared to NoC. Envisioning the unique opportunity of WNoC, The introduction of ultra wideband (UWB) brings in new opportunity for high-data rate low-power short-range communication, which renders itself a perfect solution for the physical layer of WNoC. With the uniqueness of

wireless interconnection, the WNoC design paradigm calls for effective solutions to overhaul the on-chip communication infrastructure of nano scale MPSoCs. System architecture and data transmission protocol must adapt to the critical challenges posed by both large-scale integration and small device geometries.

Two essential elements are required to realize on-chip wireless interconnection, i.e., high bandwidth and lowpower RF wireless communication and RF on-chip integration capability. A few initial steps have been taken to develop RF interconnect technologies (such as free-space transmission, guided-wave transmission, UWB, and direct near-field coupling) for inter or intrachip communication since RF was identified as an alternative interconnect technology by ITRS in 1999. Among them, the introduction of UWB brings in new opportunity for high data rate, low-power, and short-range communication. Given its ultrashort transmission range and the isolated communication environment, an extremely wide spectrum is available for the use of WNoC, leading to great potential of achieving supereminent data rate, ranging from 150 Gbps to 1.5 Tbps. With recent advances in RFCMOS, we employ a carrierfree impulse radio based UWB transceiver for WNoC, aiming at delivering low power and low-cost implementation [8]. The transmitter is designed to generate the desired pulse with proper driving strength so that the signal can be radiated from the on-chip antenna efficiently. A CMOS integrated Gaussian monocycle pulse (GMP) generator generates an ultrashort pulse that results in extremely low power spectrum density. The generated pulses can be sent individually, in bursts, or in near-continuous streams. They can encode information by pulse position modulation (PPM) or biphase modulation (BPM). Moreover, multiple access capability can be provided by directly applying modulation techniques for channelization and separation of users, such as direct sequence coding and time-hopped PPM (TH-PPM). The receiver consists of a wideband low-noise amplifier (LNA), a correlator (including a multiplier and integrator), an analog-to digital converter (ADC), and synchronization circuits. The data are recovered by the correlator. A pulse template is employed to correct the incoming pulses for coherent demodulation. ADC design usually sets a performance bottleneck for the receiver, especially the data rate. Using simplified architectures such as comparator, inverter buffer as an ADC has been further explored. Since a very high data rate is needed in WNoC, the synchronization scheme, which consists of phase synchronization and frequency synchronization, is applied. One major challenge is the efficient integration of onchip antennas and the realization of required circuits fabricated in mainstream silicon processes. Migration of short-range wireless communication to higher frequency allows smaller antennas and thus facilitates their on chip integration. In fact, according to ITRS, the cut-off frequency and unity maximum available power gain frequency targets for the year 2015 are about 490 and 710 GHz, respectively. As the maximum operating frequency of RFCMOS circuits increases with technology scaling, it is possible to implement RF circuits operating up to ~ 500 GHz, achieving a data rate as high as ~ 500 Gbps (with 1 bps/Hz bandwidth efficiency) in 32 nm CMOS technology. With multiple access, we could easily increase the aggregate data rate to above 2 Tbps. With such scaling, the required antenna and circuit areas will scale down. For example, at 24 GHz, quarter wave antennas for use in silicon is about 0.9 mm. When scaling at 500 GHz, it will be only about 40 μ m long. This will dramatically reduce the cost of on-chip wireless interconnects and greatly increase the flexibility of on-chip antennas..

K. CMP network-on-chip overlaid with multi-band RF-interconnect

In this paper, we explore the use of multi-band radio frequency interconnect (or RF-I) with signal propagation at the speed of light to provide shortcuts in a many core network-on-chip (NoC) mesh topology. We investigate the costs associated with this technology, and examine the latency and bandwidth benefits that it can provide. Assuming a 400mm² die, we demonstrate that in exchange for 0.13% of area overhead on the active layer, RF-I can provide an average 13% (max 18%) boost in application performance, corresponding to an average 22% (max 24%) reduction in packet latency. We observe that RF access points may become traffic bottlenecks when many packets try to use the RF at once, and conclude by proposing strategies that adapt RF-I utilization at runtime to actively combat this congestion.

L. Hypermeshes and k-ary n-cubes

Low-dimensional k-ary n-cubes have been popular in recent multicomputers. These networks, however, suffer from high switching delays due to their high message distance. To overcome this problem, Dally has proposed a variation, called express k-ary n-cubes. with express channels that allow non-local messages to partially bypass clusters of nodes within a dimension. K-ary n-cubes are graph topologies where a channel connects exactly two nodes. This study argues that hypergraph topologies, where a channel connects any number of nodes, thus providing total bypasses within a dimension, represent potential candidates for future high-performance networks. It presents a comparative analysis, of a regular hypergraph, referred to as the distributed crossbar switch hypermesh (DCSH), and the express k-ary n-cube. The analysis considers channel bandwidth constraints which apply in different implementation technologies. The results conclude that the DCSH's total bypass strategy yields superior performance characteristics to the partial bypassing of its express cube counterpart.

M. Express cubes

Express cubes are k-ary n-cube interconnection networks augmented by express channels that provide a short path for nonlocal messages. An express cube combines the logarithmic diameter of a multistage network with the wire-efficiency and ability to exploit locality of a low-dimensional mesh network. The insertion of express channels reduces the network diameter and thus the distance component of network latency. Wire length is increased allowing networks to operate with latencies that approach the physical speed-of-light limitation rather than being limited by node delays. Express channels increase wire bisection in a manner that allows the bisection to be controlled independent of the choice of radix, dimension, and channel width. By increasing wire bisection to saturate the available wiring media, throughput can be substantially increased. With an express cube both latency and throughput are wire-limited and within a small factor of the physical limit on performance. Express channels may be inserted into existing interconnection networks using interchanges. No changes to the local communication controllers are required.

N. A Wireless Network-on-Chip Design for Multicore Platforms

Aggressive scaling of transistors allows integration of hundreds of processors on a chip. However, on-chip interconnects carrying signals between different blocks will be the bottleneck for system performance and reliability. To tackle this problem, we developed an on-chip communication infrastructure based on a network-on-chip architecture and developed a hybrid mechanism to transfer data among IP cores by taking advantages of both wired and wireless communications. By using on-chip antennas, one can provide on-chip wireless communication to transfer data across long distances and minimize transfer latency and energy dissipation accordingly. A wireless network-on-chip architecture was designed and evaluated, and the experimental results showed significant improvement in transfer latency, network throughput and energy dissipation.

6. CONCLUSION :

Software developers generate more threads to take advantage of the multicore architecture. Multicore architectures help improve performance to power ratio by concurrently using multiple cores at a lower frequency. Studies suggest that there are various methods and designs available to minimize the communication latency among the cores in multi core system. In this paper we present the Photonic Networks-on-Chip for Future Generations of Chip Multiprocessors, CUWB-BASED ON-CHIP WIRELESS INTERCONNECTIONS, CMP network-on-chip overlaid with multi-band RF-interconnect, Hypermeshes and k-ary n-cubes, Express cubes, Wireless Network-on-Chip Design for Multicore Platforms. As well we discussed the different design platform such as Interconnection Network Topologies, NxN Mesh Network, Wireless Network-On-Chip, WNoC Topology, DASH (Directory Architecture for Shared Memory) Multiprocessor, hybrid combination of the WNoC architecture and the DASH architecture.

For future research, we plan to model and simulate multi-core systems with distributed directories by applying various parallel techniques (such as data-level-parallelism and memory-level-parallelism) to study the impact on scalability, latency, and power consumption.

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Assessment of Groundwater Pollution due to conventional on-site Sanitation Systems

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Abstract:- In this work study regarding the pollution of the groundwater in Kopargaon. The physicochemical parameters pH, Total dissolved solids(TDS), Total hardness(TH), Dissolved oxygen(DO), Biochemical oxygen demand (BOD), Chemical oxygen demand (COD), Electrical conductivity(EC), Chloride (Cl), Sulphate (S), Phosphate (Ph), Turbidity, Fluoride (F), Magnesium (Mg), Potassium (K) were analyzed. Ten Groundwater samples were analyzed, in the latter part of may-june 2016 and Nov-Dec 2015.

The Godavari River, receives all domestic and industrial waste waters from the all part of Kopargaon. The river, with no natural flow in the dry season, is extensively used for, irrigation, fishing and domestic water supply. water samples were collected from nine different points along the river and ground water samples were collected from three irrigation areas along the river. The samples were analyzed for physico-chemical parameters.

The bore groundwater samples are collected during the pre monsoon period i.e., may-June 2016 from the nine boreholes located in the study area.

Groundwater samples are collected during the post monsoon period i.e., Nov-Dec 2016 from the nine boreholes located in the study area.

Keywords : Groundwater · Pollution · Pre monsoon. Post monsoon.

1. INTRODUCTION:

1.1 Background Information

Water is essential to the existence of man and all living things. Water is a crosscutting element of the growth and poverty reduction strategy (GPRS) and is linked to the entire Millennium Development Goal. Improving water services and uses are essential for increasing hygiene and sanitation service levels that affect productive lives of people.

1.2 General

India is a tropical country with a vast diversity of climate, topography and vegetation. Though blessed with fairly high annual rainfall, it is not uniformly distributed in time and space resulting in bulk of the rainfall escaping as runoff. The scarcity of surface water especially in the lean season in most parts of the country means that groundwater plays a decisive role. Groundwater may be considered as one of the most precious and one of the basic requirements for human existence and the survival of mankind providing him the luxuries and comforts in addition to fulfilling his basic necessities of life and also for industrial and agricultural development thus being a very important constituent of our eco-system. Poor health in developing countries is largely due to diseases like cholera, dysentery, gastroenteritis and worm infections carried by contaminated food water. Effective sanitation is an important way of reducing the incidence of such diseases.

1.3 Groundwater pollution

Groundwater pollution (also called groundwater contamination) occurs when pollutants are released to the ground and make their way down into groundwater.

1.4 Importance of groundwater

Groundwater constitutes some 97% of all freshwater that is potentially available for human use. Groundwater is therefore of fundamental importance to human life. When rain falls, a part infiltrates the soil. While a proportion of this moisture will be taken up by plants or evaporate back into the atmosphere, some will infiltrate more deeply, eventually accumulating as an underground water body or reservoir.

1.5 Objectives

- Study of groundwater quality in the selected areas of Kopargaon.
- To assess the Physico-chemical parameters of Groundwater.
- To study the seasonal (i.e., pre-monsoon and post-monsoon) variation of Physico-chemical parameters at selected stations.
- To find out Water Quality Index (WQI) for Pre monsoon and Post monsoon results.

2. LITERATURE REVIEW:

Sarala C.et. al. [1] studied the groundwater quality parameters in the surrounding wells of Jawaharnagar. The bore wells data is collected from the study area for two seasons i.e., post monsoon and pre monsoon in December 2007 and June 2008. The groundwater contour analysis is done by using Arc GIS software. From the analysis it has been observed that the groundwater is polluted in the entire study area. Due to this reason during the monsoon seasons the rainwater drains into the solid waste polluting the land leachate existing in the surrounding areas and in the low lying areas.

Paras R. Pujari. et.al. [2] studied regarding the On-site sanitation. The parameters for the studies were distance of groundwater source from place of sanitation, effect of summer and monsoon seasons, local hydro-geological conditions, and physico-chemical parameters. Out of many conclusions which can be made from this studies, one major conclusion is about the influence of onsite sanitation on groundwater quality is minimal in Kolkata, whereas it is significant in Indore.

3. METHODOLOGY:

This topic consist about of result of physicochemical parameters of groundwater in selected bajartal area of Kopargaon.

3.1 Study Area: Kopargaon is a town and a municipal council in Ahmednagar district in the Indian state of Maharashtra. Study area has been selected inkopargaon town having onsite sanitation as the preferred mode of disposal of the excreta. It was also ensured that groundwater sources are available in the vicinity of the on-site sanitation systems. Sampling locations were identified in the vicinity .For physico-chemical parameters, the samples were collected in pre-cleaned 1000-ml bottles. The bottles were cleaned with double distilled water before sampling.

3.2 General profile of study area-

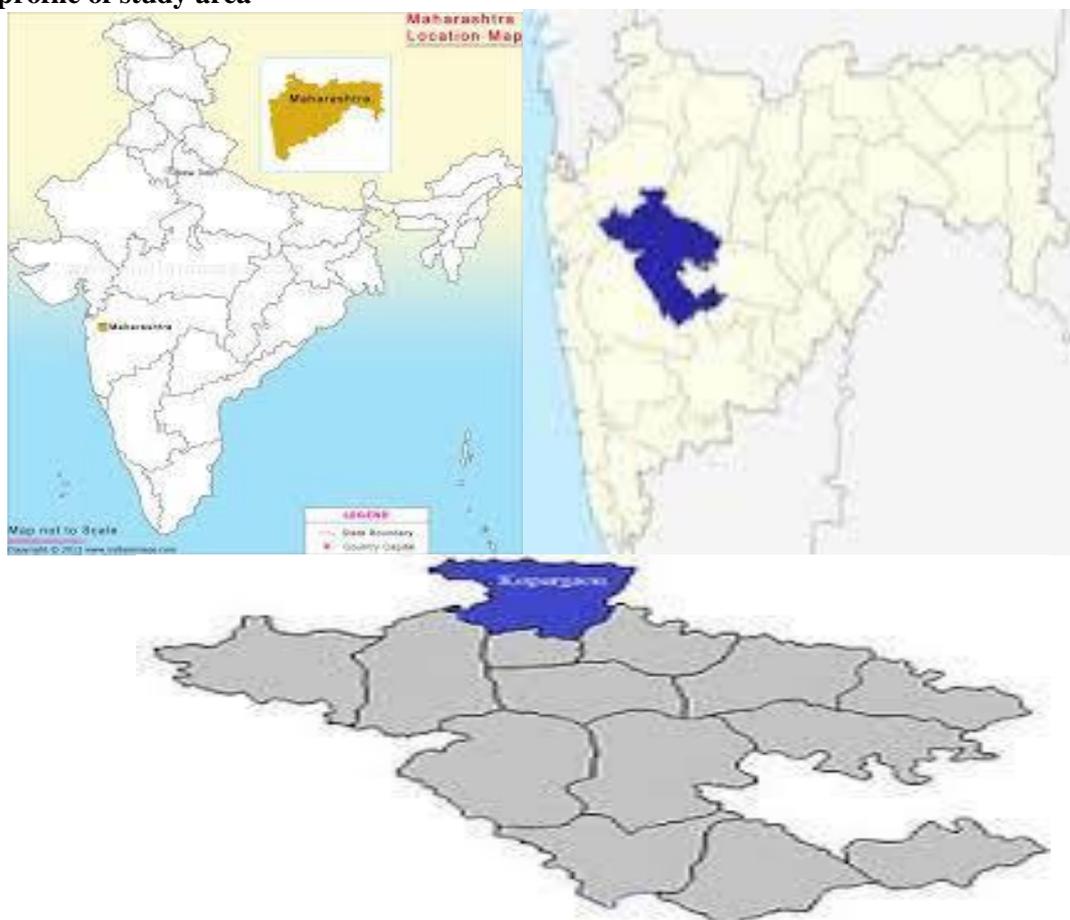


Figure 3.1 Location map of Kopargaon Taluka.

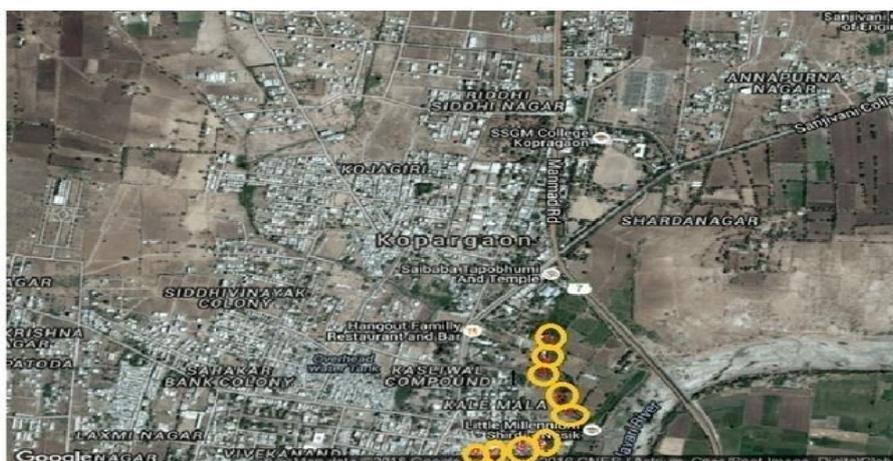


Figure 3.2 Sampling location in Kopergaon (study) area

Table 3.1 Details of Sampling Locations in rural areas of Kopergaon.

Sr. No.	Location/ Sampling station	Location details	Source details
1	S1	Anand bhavan, Bajartal, Near laxmi aai temple, Kopergaon.(Bore hole no. 1)	Tube well
2	S2	Near Swast Dhany Dukan Bajartal, Kopergaon.(Bore hole no. 2)	Tube well
3	S3	Near Krushna jwellers, Bajartal, Kopergaon.(Bore hole no. 3)	Tube well
4	S4	Front side of amardham, Bajartal, Near laxmi aai temple, Kopergaon.(Bore hole no. 4)	Tube well
5	S5	Back side of laxmi aai temple, Bajartal, Kopergaon.(Bore hole no. 5)	Tube well
6	S6	In swami Samarth temple, Kopergaon, .(Bore hole no. 6)	Tube well
7	S7	Back side of swami Samarth temple, Kopergaon, .(Bore hole no. 7)	Tube well
8	S8	Back side of swami Samarth temple, Kopergaon, .(Bore hole no. 8)	Tube well
9	S9	Back side of swami Samarth temple, Kopergaon, .(Bore hole no. 9)	Tube well

Groundwater samples collected from the groundwater sources of Kopergaon area. The nine sample stations are selected in these area because all waste of the Kopergaon town are collected near the bajartal area and swami Samarth temple, so large amount of waste collected in these area, it is directly affected on the ground water. In these way large amount of groundwater polluted in these area. The sampling was carried out manually, and water samples were analyzed within 24 hrs. samples are analyzed for various physicochemical parameters.

4. RESULT AND DISCUSSION:

In this topic Results of physicochemical parameters of selected sampling stations is discussed in detail.

4.1 A) Physicochemical analysis of ground water quality parameters during Pre Monsoon.

Groundwater samples were collected from Kopergaon. These samples were collected during summer season. In pre monsoon period first sampling was done on 12/05/2016. The various physico chemical parameters are studied and shown in table no. 4.1.

Table no.4.1 Results of Groundwater Samples in Pre Monsoon (12/05/ 2016)

Parameter/sampleno.	1	2	3	4	5	6	7	8	9
pH	7.35	7.57	7.43	7.40	7.39	7.74	7.55	7.94	7.86
TDS	1196	1213	1210	1345	1265	1289	1368	1300	1249
Total hardness	300	358	316	308	329	332	398	352	394

DO	6.2	6.16	6.55	6.15	7.05	6.26	6.57	6.77	6.87
BOD	2.9	2.94	3.0	3.2	2.97	3.15	3.21	2.98	3.14
COD	9.0	9.12	9.16	9.2	9.14	9.21	9.30	9.19	9.28
Electrical conductivity	2100	2109	2184	2169	2182	2120	2164	2197	2168
Chloride	213	216	218	215	219	216	217	220	219
Sulphate	217	224	221	214	216	218	220	227	230
Phosphate	0.08	0.09	0.09	0.08	0.07	1.0	0.08	0.09	0.09
Turbidity	5.4	5.9	5.6	5.8	5.7	5.5	5.6	5.7	5.8
Fluoride	1.5	1.51	1.58	1.5	1.5	1.55	1.51	1.58	1.57
Magnesium	1.52	1.54	1.53	1.57	1.6	1.58	1.62	1.68	1.59
Potassium	38.9	39.0	38.9	39.2	39.6	40.0	39.8	40.0	40.0

From table 4.1 it is seen that for pre monsoon period on date 12/05/2016 . pH varies from 7.35 to 7.94 and these values are within the limits prescribed by ISI, ICMR and WHO. The TDS level was found to be between 1196 to 1368 mg/l. TDS of groundwater is mainly due to vegetable decay, evaporation, disposal of effluent and chemical weathering of rocks. Hardness is one of the important properties of groundwater from utility point of view for different purposes. For potable water the TH should be limited upto 300 mg/l & maximum permissible value is 600mg/l. TH value found to be 300 to 394 mg/l. DO varies from 6.2 to 7.05 mg/l. The value of BOD and COD varies from 2.9 to 3.21 mg/l. and 9.0 to 9.30 mg/l. The Electrical conductivity range between 2100 to 2184 mg/l. The desirable value of chloride content is 250 mg/l. Above taken samples were found concentration of chloride vary from 213 to 291 mg/l. Obtained range which is slightly higher than permissible limits. The Sulphate in the groundwater shows a range of 213 to 220 mg/l. It is in between 200 to 400 mg/l so which is within permissible limits. All values of Phosphate is less than 0.1. Turbidity should be limited upto 5l & maximum permissible value is 10 mg/l. it indicates 5.4 to 5.9 mg/l which is within permissible limits. The fluoride content in the groundwater shows a range of 1.5 to 1.58 mg/l. In all samples fluoride concentration is in permissible limit. Concentration of magnesium values observed 1.52 to 1.68 mg /l. Concentration of Potassium values observed 38.9 to 40.0 mg /l.

4.1 B) Physicochemical analysis of ground water quality parameters during Post Monsoon.

Groundwater samples were collected from Kopargaon . These samples were collected during post monsoon season. In post monsoon period first sampling was done on 17/10/2015. The various physico chemical parameters are studied and shown in table no. 4.2

Table no.4.2 Results of Groundwater Samples in Post Monsoon (17/10/ 2015)

Parameter/sampleno.	1	2	3	4	5	6	7	8	9
pH	6.30	6.50	6.43	6.40	6.39	6.74	6.55	7.00	6.86
TDS	1090	1013	1110	1145	1065	1089	1168	1100	1149
Total hardness	128	158	129	128	129	132	198	252	194
DO	4.2	4.16	4.55	4.15	4.05	4.26	4.57	4.77	4.87
BOD	1.7	1.94	1.05	1.2	1.97	1.15	1.21	1.98	1.14
COD	8.0	8.12	8.16	8.2	8.14	8.21	8.30	8.19	8.28
Electrical conductivity	2006	2009	2080	2069	2022	2010	2069	2097	2068
Chloride	203	206	208	205	198	196	197	192	199
Sulphate	120	120	123	124	126	128	120	127	130
Phosphate	0.06	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06
Turbidity	3.6	3.9	3.6	3.8	3.7	3.6	3.6	3.7	3.8
Fluoride	1.06	1.06	1.08	1.06	1.13	1.10	1.11	1.18	1.17
Magnesium	1.30	1.34	1.33	1.37	1.4	1.38	1.32	1.28	1.39
Potassium	37.6	37.1	37.4	38.2	37.6	38.0	37.8	38.2	38.3

From table 4.2 it is seen that for Post monsoon period on date 17/10/2016 . pH varies from 6.30 to 7.00. The TDS level was found up to 1013 to 1149 mg/l. TH value found to be 128 to 252 mg/l. DO varies from 4.05 to 4.87 mg/l. The value of BOD and COD varies from 1.14 to 1.98 mg/l. and 8.0 to 8.30 mg/l. The Electrical conductivity range between 2006 to 2097 mg/l. The desirable value of chloride content is 250 mg/l and concentration of chloride vary from 192 to 208 mg/l. The Sulphate in the groundwater range from 120 to 130mg/l. All values of Phosphate

are less than 0.1. Turbidity vary between 3.6 to 3.9 NTU. which is within permissible limits. The fluoride content in the groundwater shows a range of 1.06 to 1.18 mg/l. Concentration of magnesium was observed between 1.28 to 1.4 mg/l. Concentration of Potassium was observed between 37.1 to 38.2 mg/l.

Table 4.3 Water Quality Classification based on WQI Values.(pre monsoon) (12/05/2016)

Sample no.	Location of samples	WQI of Samples	Water Quality
S1	Anand bhavan, Bajartal, Near laxmi aai temple, Kopargaon.(Bore hole no. 1)	743.053	Water unsuitable for Drinking.
S2	Near Swast Dhany Dukan Bajartal, Kopargaon.(Bore hole no. 2)	769.713	Water unsuitable for Drinking.
S3	Near Krushna jwellers, Bajartal, Kopargaon.(Bore hole no. 3)	756.107	Water unsuitable for Drinking.
S4	Front side of amardham, Bajartal, Near laxmi aai temple, Kopargaon.(Bore hole no. 4)	820.472	Water unsuitable for Drinking.
S5	Back side of laxmi aai temple, Bajartal, Kopargaon.(Bore hole no. 5)	787.789	Water unsuitable for Drinking.
S6	Back side of swami Samarth temple, Kopargaon, .(Bore hole no. 6)	799.956	Water unsuitable for Drinking.
S7	Back side of swami Samarth temple, Kopargaon, .(Bore hole no. 7)	859.498	Water unsuitable for Drinking.
S8	Back side of swami Samarth temple, Kopargaon, .(Bore hole no. 8)	812.461	Water unsuitable for Drinking.
S9	Back side of swami Samarth temple, Kopargaon, .(Bore hole no. 9)	799.310	Water unsuitable for Drinking.

In this study areas, the computed WQI values ranges from 743.053 to 859.498 and therefore can be recognize into five types “excellent water” to “water unsuitable for drinking”. Referring to the table 4.3 The high value of WQI at these stations has been found to be mainly from the higher values of TDS, Hardness in groundwater.

Table 4.4 Water Quality Classification based on WQI Values at Kopargaon

WQI values	Water Quality	Percentage of water samples
< 50	Excellent	00
50 -100	Good water	00
100 – 200	Poor water	00
200 – 300	Very Poor Water	00
300	Water unsuitable for Drinking.	100.00

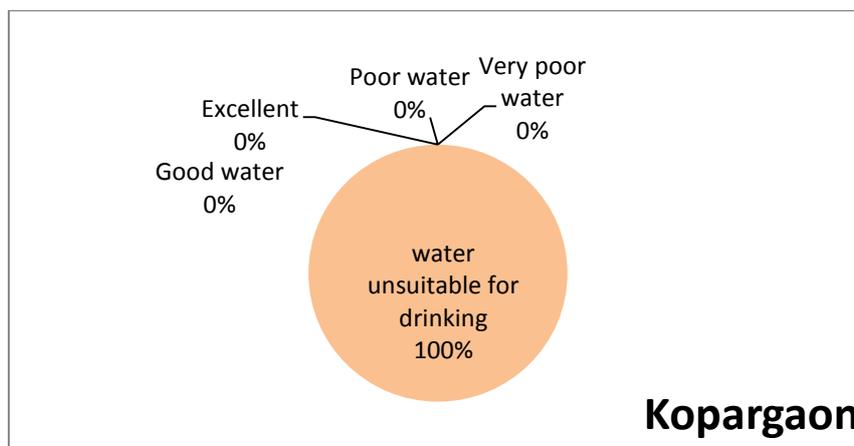


Figure 4.1 Groundwater quality status at Kopargaon.(Pre monsoon)

5. CONCLUSION:

This topic consist of the summary of the results obtained for pre monsoon and post monsoon period.

The bore well groundwater samples are collected during the pre monsoon period and post monsoon period i.e., April-may 2016 and Nov-dec 2015 from the nine bore well holes located in the study area. The quality analysis

has been carried out for the parameters like pH, TDS, TH, DO, BOD, COD, EC, Cl, S, Ph, Turbidity, F, Mg, K by following the standard methods prescribed as per IS codes.

All values of various parameters in pre monsoon period i.e. pH, DO, BOD, COD, EC, Cl, S, Ph, Turbidity, F, Mg, K etc. is within limits of the value of WHO and BIS and TDS, TH are larger value than the value of WHO and BIS

As per results in pre monsoon and post monsoon period all values of water quality index (WQI) are greater than 300 so these water are unsuitable for drinking. These water are only useful for the domestic purpose.

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Application of Artificial Neural Network for the Problem of RSSI Based Target Tracking in Wireless Sensor Networks

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Abstract: In a wireless communication system, wireless location is the technique used to estimate the location of a mobile station (MS). To enhance the accuracy of MS location prediction, we propose a novel algorithm that utilizes time of arrival (TOA) measurements and the angle of arrival (AOA) information to locate MS when three base stations (BSs) are available. Artificial neural networks (ANN) are widely used techniques in various areas to overcome the problem of exclusive and nonlinear relationships. In the last decade, the growing use of ANN have been reported to solve the problem of target localization and tracking. This paper discusses the traditional RSSI based tracking problem and various ANN techniques utilized for the same.

Kalman Filter (KF), Received Signal Strength Indicators (RSSIs), root mean square error (RMSE), Target Tracking, Unscented Kalman filter (UKF), Wireless Sensor Networks (WSNs).

Key Words: Kalman Filter (KF), Received Signal Strength Indicators (RSSIs), root mean square error (RMSE), Target Tracking, Unscented Kalman filter (UKF), Wireless Sensor Networks (WSNs).

1. INTRODUCTION:

Dramatic advances in RF and MEMS IC design have made possible the use of wireless sensor network's (WSN's) for a variety of new monitoring and control applications [1]–[5]. The target localization and tracking is one of the fundamental research area of WSN with diverse military and civilian applications. Originally developed for military applications, today it is being an integral part of plenty of civilian applications such as locating moving objects in building, tracking people inside building, wildlife tracking, environmental monitoring as well as emerging next generation mobile applications. The performance of such applications highly depends on the accuracy in locating the moving target of interest as well as in predicting its future path in WSN area. Although localization can be done with sufficient accuracy by using GPS with the help of satellites. Although, GPS performs well for line of sight (LOS) to several satellites, maintaining LOS is generally a rare possibility especially for indoor environments. Target tracking based on data from a low cost WSN is more economical approach as compared to the use of GPS. Consequently, the research trend is to develop WSN based (GPS-less) solutions, aimed to improve the target localization and tracking accuracy especially under constraints of limited resources (energy and bandwidth) of WSNs. GPS-less localization algorithms can be classified as range free and range based algorithms. The Range free technique exploits the connectivity between nodes for estimating locations, whereas the range based technique requires estimation of distance between nodes for localization. Although range free techniques are inexpensive as compared to range based technique, it offers less localization accuracy as well [6]–[8]. Another classification divides the localization and tracking approaches in wireless networks to indoor and outdoor environment [9].

In WSN domain there are wide variety of technological alternatives to carry out localization and tracking such as radio frequency (RF), infrared (IR), video, acoustic and ultra wideband (UWB). Moreover, RF as compared to rest of the others is widely used because of their ability to penetrate smoke, nonmetallic barriers and walls, making it a better choice for localization and tracking applications [9]. It is basically a range based estimation technique, which utilizes Received Signal Strength Indicator (RSSI) to track moving objects. The RSSI measured is basically a function of the distance between the transmitter and the receiver as described by many propagation models [11]. As many wireless transceivers have inbuilt RSSI circuitry, RSSI based techniques are simple, inexpensive and have a lower power consumption as compared to other range based techniques such as time of arrival (TOA), time difference of arrival (TDOA), and angle of arrival (AOA) [10]. However there are many challenges in applying these models especially in indoor environment as compared to outdoor environment, due to variations in the indoor layout structure, objects, and humans. Such obstructions generally lead to reflection, refraction, diffraction, and absorption of radio signals.

Moreover, many other factors also influence the RSSI, such as temperature, orientation of antenna, and height to the ground. Due to such a dynamicity of wireless medium, errors in RSSI measurements are unpredictable leading to erroneous tracking results [10]-[12]. Therefore more research efforts are being applied by the research community to cope up with this dynamicity in RSSI measurements since last decade.

While simultaneous target recognition and tracking is easily performed by biological systems ~e.g., insects!, the process requires a vast amount of computational effort and complex programming techniques for even highly parallel traditional digital signal processors. There are currently very powerful very large scale integration ~VLSI! digital signal processors with capabilities of beyond 100 million floating point operations per second ~e.g., the Hughes VSP signal processor!; however, as processor architectures become more sophisticated, the costs of developing, maintaining, and programming increases.

Localization with noisy distance measurements is a critical problem in many applications of wireless sensor networks. Different localization algorithms offer different tradeoffs between accuracy and hardware resource requirements. In order to provide insight into selecting the best algorithm that optimizes this tradeoff, this paper evaluates the accuracy, memory, and computational requirements of two approaches that may be taken in localization: neural networks and Kalman filters. Neural networks are modeled after biological nervous systems and are a network of interconnections between nodes called “neurons” with activation functions. Different classes of neural networks can be obtained by varying the activation functions and the structure of the weighted interconnections between the neurons.

The structure of the paper is as follows. Section II discusses Localization of Mobile Target. Section III presents the Artificial Neural Network Overview. Finally, conclusions is highlighted in Section V.

2. LOCALIZATION OF MOBILE TARGET:

The prime objective of localization and tracking is the determination of the possible positions (localization problem) of the moving targets and their trajectories (tracking problem) by exploiting the field measurements at regular intervals of time [9],[12]. That means the tracking problem can be described as the solution of a set of localization problems at successive time intervals. Consider the two-dimensional problem of localization of a mobile target. The vector $\{(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)\}$ of positions of the mobile target is estimated given n_r anchors with known coordinates $\{(x_{n+1}, y_{n+1}), (x_{n+2}, y_{n+2}), \dots, (x_{n+n_r}, y_{n+n_r})\}$ and pairwise measurements $\{z_{ij}\}$, where z_{ij} is a measurement between devices i and j . Generally the locations of anchor nodes are obtained with the help of GPS prior to localization and tracking process. Each anchor node carries a wireless transceiver so as to estimate the distance between target and anchors with the help of RSSI measurements.

The RSSI measurements are basically an outcome of a particular propagation models. Currently the major popular propagation models are free space model, two-ray ground reflection model, and the log normal shadowing model (LNSM) [11], [13]. The free space model and the two ray model predict the received power function of distance deterministically. They both consider the distance between transmitter and receiver as an ideal circle. But practically the received power at certain distance is a random variable due to multipath fading effects. As the LNSM considers fading effects, it is more widely adopted by the research community. This paper follows LNSM in the research work.

The RSSI ($z_{ij,k}$) received at the node N_i with coordinates (x_{1k}, y_{1k}) at time k , after being transmitted from the node N_j with coordinates (x_{jk}, y_{jk}) , propagates as follows [29], [30]:

$$z_{ij,k} = P_r(d_0) - 10n \log(d_{ij,k}/d_0) + X_\sigma, \quad (5)$$

where $P_r(d_0)$ is RSSI measured at receiver node located at reference distance d_0 (generally $d_0 = 1 \text{ meter}$ meter) from transmitter, and X_σ is normal random variable (a measure of shadowing effect) with a standard deviation of σ . It ranges from 3 to 20 dBm. The n is the path loss exponent, and is selected as per the application environment or empirically determined by field measurement. Larger the value of n , higher would be the amount of obstructions and the rate of decrease of received power as well. The table 1 shows typical values of n for indoor and outdoor environments.

TABLE 1
Typical Values of Path Loss Exponent (n)

Environment		N
Outdoor	Free space	2

	Shadowed urban area	2.7 to 5
Indoor	Line-of-sight	1.6 to 1.8
	Obstructed	4 to 6

The distance $d_{1j,k}$ between nodes N_1 and N_j can be computed with the help of equation (6) as given below.

$$d_{1j,k} = d_0 10^{(P_r(d_0) - z_{1j,k} + X_\sigma) / 10n} \quad (6)$$

In order to locate the mobile target using the traditional RSSI based technique at any given time instance and thereby track it for successive time instances, minimum three (in case of trilateration) or four (in case multilateration) distances of target from reference nodes along with their location coordinates, are required to compute the location of target.

3. ARTIFICIAL NEURAL NETWORK OVERVIEW:

Artificial Neural Network

Artificial neural networks (ANNs) are biologically inspired computer programs designed to simulate the way in which the human brain processes information. ANNs gather their knowledge by detecting the patterns and relationships in data and learn (or are trained) through experience, not from programming. An ANN is formed from hundreds of single units, artificial neurons or processing elements (PE), connected with coefficients (weights), which constitute the neural structure and are organized in layers. The power of neural computations comes from connecting neurons in a network. Each PE has weighted inputs, transfer function and one output. The behavior of a neural network is determined by the transfer functions of its neurons, by the learning rule, and by the architecture itself. The weights are the adjustable parameters and, in that sense, a neural network is a parameterized system. The weighed sum of the inputs constitutes the activation of the neuron. The activation signal is passed through transfer function to produce a single output of the neuron. Transfer function introduces non-linearity to the network. During training, the inter-unit connections are optimized until the error in predictions is minimized and the network reaches the specified level of accuracy. Once the network is trained and tested it can be given new input information to predict the output. Many types of neural networks have been designed already and new ones are invented every week but all can be described by the transfer functions of their neurons, by the learning rule, and by the connection formula. ANN represents a promising modeling technique, especially for data sets having non-linear relationships which are frequently encountered in pharmaceutical processes. In terms of model specification, artificial neural networks require no knowledge of the data source but, since they often contain many weights that must be estimated, they require large training sets. In addition, ANNs can combine and incorporate both literature-based and experimental data to solve problems. The various applications of ANNs can be summarized into classification or pattern recognition, prediction and modeling. Supervised associating networks can be applied in pharmaceutical fields as an alternative to conventional response surface methodology [14]. Unsupervised feature-extracting networks represent an alternative to principal component analysis. Non-adaptive unsupervised networks are able to reconstruct their patterns when presented with noisy samples and can be used for image recognition.

Model of Artificial Neural Network

The following diagram represents the general model of ANN followed by its processing.

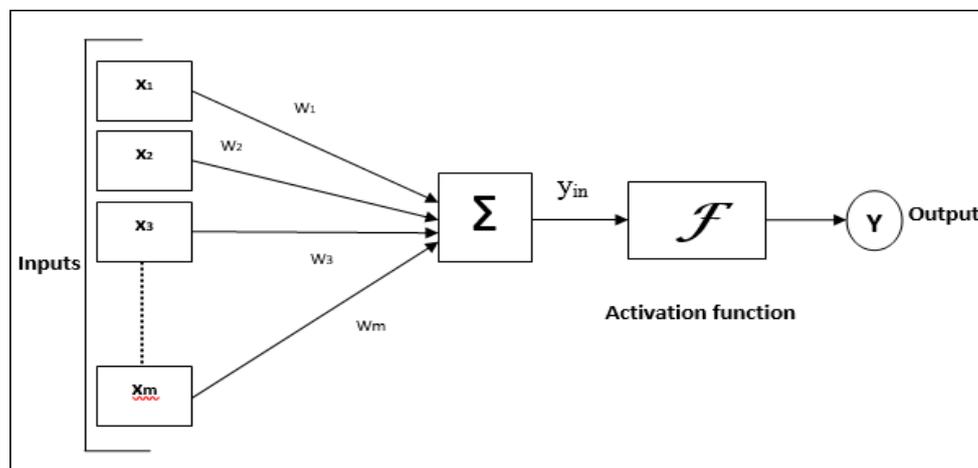


Figure 1.: Mathematical Model of Single Artificial Neural Network

Where, X_i ($i=1,2,\dots,m$) are the inputs, W_i ($i=1,2,\dots,m$) are the associated weights, Y_{in} is the output of net and Y is the final output of individual artificial neuron after the activation function.

ANN Based Target Tracking Works

In this paper, we quantitatively compare the localization performance of a *Multi-Layer Perceptron* (MLP) neural network, PV, and PVA models of the *Extended Kalman filter*. Our experimental results show that the MLP neural network has weaker self-adaptivity than the Extended Kalman filters; however, the MLP can potentially achieve the highest localization accuracy and requires the least amount of computational and memory resources [15].

In this paper a WSN based fingerprinting localization method was presented. The RSSI values of the communication links between the previously situated sensors and the mobile sensor were recorded in an indoor environment through the experiment. Using the recorded RSSI values a feed-forward type of neural network was trained. The result of the training is a neural network capable of performing indoor localization. The WkNN algorithm was used as a reference model for the performance verification of the created neural network. The accuracy of the localization between the real and the calculated values was measured with Euclidean distance and demonstrated with the cumulative distribution function. The results have shown that the accuracy of derived neural network also depends on the target position to be determined [16].

Shareef et al. [17] made a comparative work in a real environment is performed among several ANN based on methods such as Radial Basis Function (RBF), Multi-Layer Perceptron (MLP), Recurrent Neural Networks (RNN), Position-Velocity (PV), Position Velocity Acceleration (PVA) and Reduced Radial Basis Function (RRBF). These methods evaluate the location errors in centimeters using these techniques in a 3x3 meters indoor environment. However, they do not compare the performance between some of the ANN methods with the common localization methods applied in a real environment; their results do not show a benchmark among the solutions. Tian and Xu [18] performed in a real environment a comparison between a Multi-Layered Perceptron Neural Network (MLPNN) model and two Kalman Filter models, namely PV and PVA techniques. The environment measures 3x3 meters, marked in grid spacing of 0.30 meters with four beacon nodes located in the vertices of a square. The mobile nodes were placed on each intersection of the grid to collect the data. The experimental results indicate that the MLPNN neural network has the best performance, but there is a potential retraining or redesign cost associated with the use of MLP, which is not associated with the Kalman's filter [13]. This work only compares Kalman's filter with MLPNN, not with tests performed using mathematical techniques [19].

A feed-forward neural network based methodology is adopted in this paper. The Received Signal Strength Indicator (RSSI) values of the anchor node beacons are used. The number of anchor nodes and their configurations has an impact on the accuracy of the localization system, which is also addressed in this paper [20]. Five different training algorithms are evaluated to find the training algorithm that gives the best result. The multi-layer Perceptron (MLP) neural network model was trained using Matlab. In order to evaluate the performance of the proposed method in real time, the model obtained was then implemented on the Arduino microcontroller. With four anchor nodes, an average 2D localization error of 0.2953 m has been achieved with a 12-12-2 neural network structure. The proposed method can also be implemented on any other embedded microcontroller system.

4. CONCLUSIONS :

One major benefit of a neural network is that prior knowledge of the noise distribution is not required. Noisy distance measurements can be used directly to train the network with the actual coordinate locations. The neural network is capable of characterizing the noise and compensating for it to obtain the accurate position. Compared with Kalman filter methods, the neural network does have some advantages. The Kalman filters iteratively localize, correcting their estimates over time based on the noise parameters. The neural network on the other hand localizes in a single pass of the network. The Kalman filter uses the laws of kinematics to predict the location of the tracked object. If the tracked object's motion is random and spontaneous the neural network's ability to localize in a single pass results in more accurate estimates every time. The Kalman filter, however, requires several iterations before it begins to reach the accuracy of the ANN.

In conclusion, where noise parameters are not expected to change, the localization method using neural networks may be the best option. The high accuracy, minimal computational and memory requirements are highly desirable in embedded systems. If a flexible and easily modifiable method is required, then the Kalman filters may be a better option.

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**'Sanjyot-2018' National Seminar on
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ECONOMICAL ROAD DIVIDER AND NATURAL FENCE

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Abstract: *Being the Second Largest Road Network of over 54,72,144 Kilometres, India has perfectly set to be on the verge of becoming Developed Nation. Road Transport has always remained as first choice by the transporters. Yet in terms of Road Safety India is missing its rank as it is also a destination for Maximum Road Accidents. Statistics says in India Road Accidents leads to sad demise of one person in every four Minutes due to negligence. The Road Safety issue becomes more sensitive during Night driving because of high beam-perils. During night time every vehicle has its headlights on, and we have high beams on highways. The plants planted on divider acts as barrier in order to avoid glare from the vehicle coming in the opposite direction and hence reduce accidents because many times glare from head lights blinds the vision for some seconds which is enough time for accidents to happen. Tulsi plant can be implanted as natural barrier which can achieve maximum economy and gives zero maintenance cost of divider. This natural barrier gives numerous advantages than artificial divider. Has anyone wondered about pollution condition of today's dividers in India? Road safety divider are used to prevent vehicle from colliding. They are made up of concrete. However, it leads to higher expenses and also causes emission of hazardous gases such as Carbon Dioxide, Methane, Nitrous oxide, Precursor gases (NOx, CO, NMVOCs, SO2, HFCs, PHCs and SF6) etc. To avoid such emissions, an attempt is being made to develop Road Safety Divider Materials for ensuring environment friendly and economical substitute. Using some suitable substitute material we can reduce the economical cost of divider by 51%. Hence this paper attempts in development of economical road dividers and natural fence diminishing blur vision and reducing road accidents.*

Key Words: *Road accidents, blind vision, concrete divider, tulsi, oxygen emission, greenhouse gases.*

1. INTRODUCTION:

Road transportation provides benefits both to nations and to individuals by facilitating the movements of goods and people. It enables increased access to jobs, economic market, education, recreation and health care, which in turn have direct and indirect positive impacts on the health of the population. However, the increase in road transportation has also placed a considerable burden on people's health in the form of road traffic injuries, respiratory illness and the health consequences that ensue from a reduction in physical activity. There are additional negative economic, social and environmental consequences that arise from movement of people and goods on the roads- such as air pollution, greenhouse gas emissions, consumption of finite resources, community severance, and noise. Road traffic death rates in many high income countries have stabilized or declined in recent decades, data suggests that in most of the regions of the world the global epidemic of the traffic injuries is still increasing. It has been estimated that, unless immediate action is taken, road deaths will rise to the fifth leading cause of death by 2030, resulting in an estimated 2.4 million fatalities per year. Road accidents have been emerged as a new health challenges in the world which not only leads to injuries, disabilities and loss of precious human lives but also imparts substantial economical burden on the family concerned and nation as a whole. A number of factors contributing to the risk of collision including vehicle design, speed of operation, road design, road environment etc. After Ms Marry Ward, who was first documented victim of automobile accident that took place on August 31 1869, the global status report on road safety 2015, reflecting information about 180 countries, indicates that worldwide the total number of road traffic deaths has plateaued at 1.25 million per year, with the highest road traffic fatality rates in low income countries. Statistics says that in India road accidents leads to demise of one person every four minutes due to negligence. The problem is much more in the country where close to 5,00,000 road accidents caused nearly 1,46,000 deaths and left more than thrice

that number injured. In order to implement preventive measures a detailed green data is inevitably required. This study aims to provide a base line data to avoid increasing road accidents.

2. OBJECTIVE:- To study the road divider mechanisms practiced in India and to give economical cum environment friendly substitute.

To give an substitute which will help to reduce the road accidents causing due to intense beam of headlight causing blur vision.

3. SCOPE:- In this paper there is an attempt to use environmental friendly, recycled and cost effective products which gives us economy up to 39% as road divider material. Also we have to provide a tulsi shrub which acts as barrier and will act as translucent green material. These tulsi plants are to be planted outskirts of cities i.e. on national highway, state highway etc. Where as in city area we can plant beautification plants like chafa, bougainvillea etc. Tulsi plant not only sustain the pollution on the divider but also reduces the pollution by emitting oxygen for 20hrs, ozone for 4 hrs, and nascent oxygen which helps to reduce the pollution on the road. Also it helps in keeping environment fresh along highway which can boost the brain activity of the drivers and eventually they will remain fresh whole journey. Planting tulsi plant can also provide huge labor pool as there are many herbal medicinal factories emerging in this era. As there is fast growth of tulsi shrub hence germination process is also very fast, so there is densification, which will totally act as translucent material. We can use tulsi leaves, stem, flowers bark etc. as ingredients for herbal products like tulsi water, tulsi capsules etc. hence maximum economy will be achieved, hence one cause of road accidents can be minimized.

4. LIMITATIONS:

- Lack of available/reliable data.
- Lack of prior research study on the topic.
- Lack of exact mathematical interpretation.
- Self-reported data.

5. DATA ANALYSIS:

ESTIMATION OF COST:

For current concrete road divider:

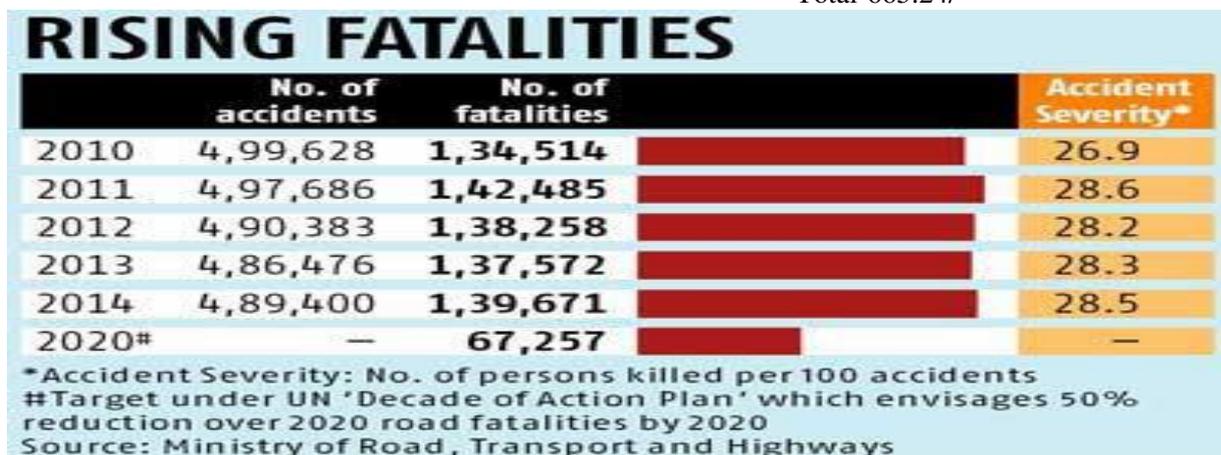
Ingredients	Material required	Cost (Rs)
Cement	156kg	842.4/-
Sand	156kg	103.35/-
Aggregate	312kg	144.67/-

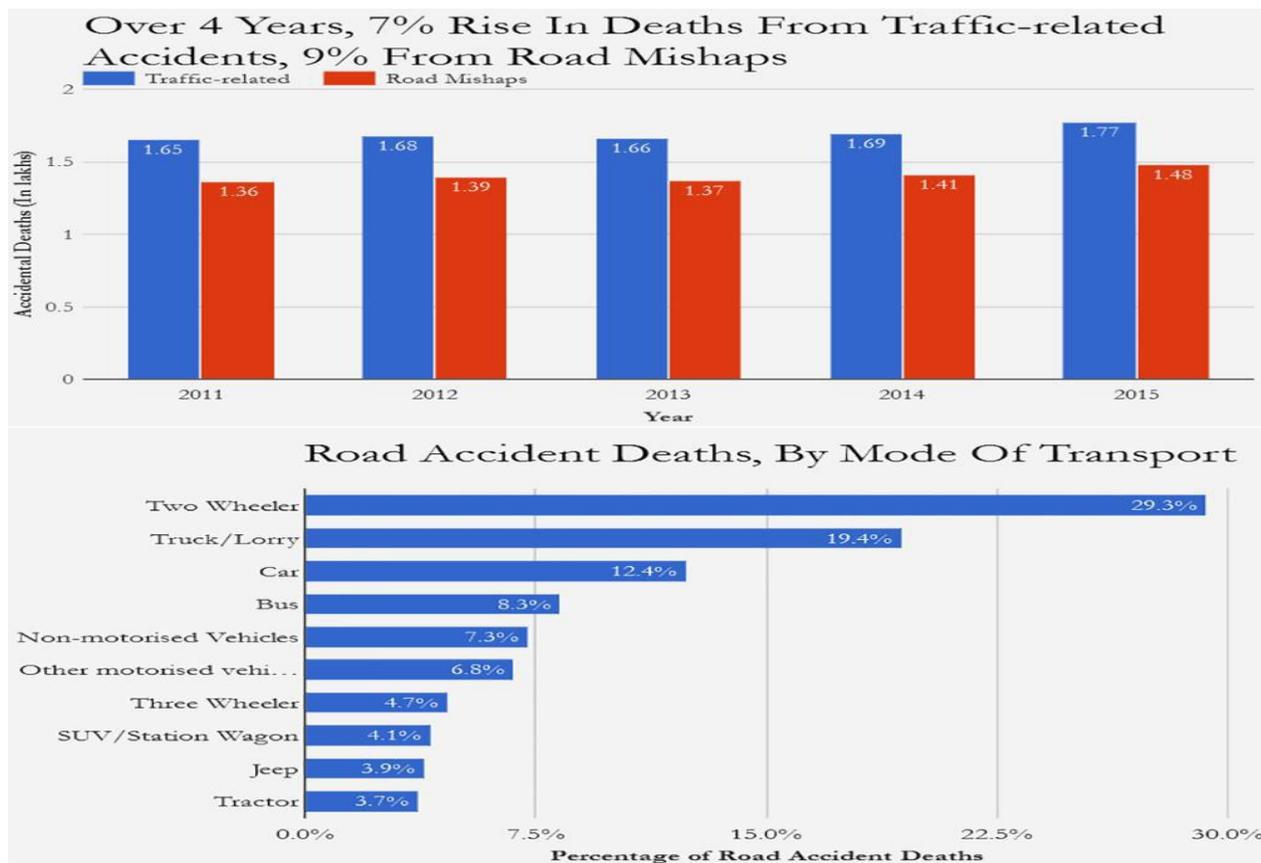
Total-1090.42/-

For the eco-friendly road divider:

Ingredients	Material required	Cost(Rs)
Fly ash+cement	156kg	475.8/-
Surkhi	156kg	51.67/-
Broken brick bats	312kg	137.77/-

Total-665.24/-





6. FINDINGS:

The report estimates that the cement production by plants is set to increase at the rate of 8.2 per cent per year to 237 million metric tons in 2012. This also contributes to increased carbon emissions. This paper aims to provide suitable economical, eco-friendly material to reduce carbon emission. Here 38.99 % of economy is achieved. **During night time every vehicle has its headlights on, and we have high beams on highways. The plants planted on divider acts as barrier in order to avoid glare from the vehicle coming in the opposite direction and hence reduce accidents because many times glare from head lights blinds the vision for some seconds which is enough time for accidents to happen.**

7. CONCLUSION:

Road accidents is increasing every year and is dangerous to all people. In this situation all people must realize and give more attention to decrease the rate of road accident. At the same time, all people must co-operate with authorities to settle these problems. The causes are road condition from poor, climate and vehicle factors. The rate of road accidents can be reduced by the various accidents including from education, comfortable road condition, campaign and enforced the law. If all people give support and cooperation, this problem could be settled easily and our country also can decrease the number of death that results from road accidents.

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Comparison of Bolted and Bonded Joints in Composites: A Review

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Abstract: Composite materials are highly used in several different fields like aerospace structure, marine, automobile, etc. Due to high strength, they are widely used in the low weight applications and also as an alternate for metals to reduce the material cost. There are various types of methods used for joining the composite materials. The single lap joint will be prepared by joining Adhesive bonding and bolted joints methods. The experimental study will be carried out to find out mode of failure in single lap glass fiber reinforced polymer (GFRP) joints. In adhesive bonding, the FEA will be carried out by varying the overlap thickness and adhesive bonding lengths. In the same manner the experiment was carried out for bolted joint by varying the number of bolt. The present study deals with the analysis of single lap joint subjected to tensile test and stress distribution in the joint members under various joining methods,

1. INTRODUCTION:

The need to design lightweight structures and the increased use of lightweight materials in industrial fields, have led to wide use of adhesive bonding. Recent work relating to finite element analysis of adhesively bonded joints in terms of static loading analysis, environmental behaviors, fatigue loading analysis and dynamic characteristics of the adhesively bonded joints. Due to its low manufacturing cost, low stress concentration and ease of maintenance, adhesive bonding is now one of the most commonly and widely used joining systems in various industrial applications. The design and testing issues that affect the strength, stiffness and life expectancy of bonded and bolted joints under quasistatic (monotonic), cyclic and creep loading conditions. Factors, such as specimen geometry, material properties, processing variables and surface treatment are considered in addition to test parameters (i.e. loading mode and alignment) and bolt parameters (i.e. torque or clamping force, and single- and multi-bolt arrays). It includes advice on data requirements and a test method required to generate design data, and provides advice on design, testing and manufacture of bonded and bolted structures. The single-lap bonded and hybrid (bolted/bonded) joints with flexible adhesives using finite element analysis [1]. Numerical analyses of hybrid bolted bonded (HBB) joints showed their fatigue life is longer than corresponding bolted joints. Single-lap bonded and HBB joints with flexible adhesives were simulated in 2D plane strain and in 3D using SAMCEF FE code. This allows us to conclude that the fatigue life of HBB joints is longer than for corresponding bolted joints [1, 5]. A special purpose method for the static stress analysis of a composite bonded/bolted single lap joint. This method takes into account nonlinear constitutive behavior of the adhesive, contact, bolt-hole clearance and bolt clamp-up. Predicted failure modes and the different joints' load-displacement behavior were in agreement with empirical joint design rules and experimental observations available in the literature [2].

A study on the static and fatigue performance of adhesive/bolted (hybrid) joints in a structural reaction injection molded composite. It is shown that the hybrid joints have a higher static failure load and longer fatigue life than the adhesive joints [3]. However, the performance of hybrid joints depends on the washer design. The 25.4-mm square washer in the experiment, representing full clamping to the edges of the overlap area, gives a better performance compared to the 19-mm diameter round washer, representing partial clamping [3]. The numerical analysis, with application of a cohesive zone model was convenient for the description of the adhesive and hybrid joints [4]. FRP composites have been widely used for constructing entire civil structures. One of the challenging issues for building with pultruded FRP composites understands the behavior of bolted joints. In this paper, the results of a numerical analysis performed on different types of bolted composite joints with different geometry and subjected to tensile loads are reported. The aim of this study is to examine the distribution of shear stresses among the different bolts by varying the number of rows of bolts as well as the number of bolts per row [6]. FRP sandwich decks to steel support adhesively bonded joints were experimentally investigated under the tensile loading condition. The

mechanical behavior of adhesive joint specimens with surface pretreatment (SP) and un-pretreatment (UP) were compared. The average ultimate failure load of surface pretreated specimens was 17.62 KN, which was 9.83% higher than that of un-pretreated specimens [7].

The experiments and finite element analyses were conducted to investigate the behavior and strength of different configurations of bolted glass fiber reinforced plastics (GFRP) beam-to-beam (Girder) connections. The finite element analysis was carried out using ANSYS Workbench version 14.5 and the results were validated by comparison with experimental results [8]. Modeling the bolts with beam elements instead of 3D bolt models gave competent results whilst saving computational time and memory. This study shows that finite element method can be effectively used to study the behavior of bolted GFRP joint connections [8]. The objective of the sensitivity analysis was to quantify the relative importance of the different joint design parameters (factors) in load sharing. It was determined that adhesive yield strength is singularly the most important factor, by between 2 and 9 times depending on the level of load applied to the joint [9]. The joint E/D ratio, adhesive hardening slope and adhesive thickness were found to be other significant factors influencing load sharing. The controlling the adhesive thickness and minimizing the bolt-hole clearance can be useful in limiting the maximum plastic strain developed in the adhesive at the overlap edges [9]. A global bolted joint model (GBJM) for highly efficient finite element simulations of load distributions in multi-bolt composite joints has been presented. The GBJM is capable of capturing the physical parameters of a bolted joint to a high degree of accuracy (bolt-hole clearance, bolt-torque and friction) [10]. A substantial parameter study has shown that the GBJM is both accurate and robust and is a highly efficient tool for predicting load distributions in multi-bolt joints. It is expected that the GBJM would also be applicable to multi bolt [10].

Adhesively-bonded joint is used in FRP-steel composite bridge under shear loading. Due to the composite action between the Fiber-Reinforced Polymer (FRP) decks and steel girders, the deck and girder tend to bend together to carry the loading, which induce the shear stress in the adhesively- bonded joint between them [11].

The combination of adhesive bonding with spot-welding enables some advantages over adhesive joints such as increased stiffness, and higher static and fatigue strength. Selection of adhesive for single-lap adhesive joints by the bonding and hybrid (bonded and welded) techniques with different overlap lengths affects strength of joint. The experimental results were compared against a Finite Element (FE) study coupled with Cohesive Zone Modeling (CZM). The FE/CZM technique for the design of hybrid joints was also positively validated [12]. Finite element analysis (FEA) was performed to verify the static and fatigue strength of bolted, bonded and hybrid joint configurations. Thick carbon fiber/epoxy laminates and aerospace grade film adhesive and fasteners were selected [13]. The developed dimensioning method for bolted, adhesively bonded, and hybrid joints involving Fibre-Reinforced-Polymers. The overall performance and efficiency of any structure depend on the connections that join their components as such they constitute the most critical component [14].

2. Performance of adhesively/ Bonded joints:

2.1. 2D FE modelling of single-lap bonded joints:

The adherend material is assumed isotropic linear elastic; the adherends are referred to aluminium. The FE models used the 2D iso-parametric plane strain quadrilateral elements T015 in SAMCEF. A progressive mesh towards the overlap ends was adopted, in order to take into account the stress gradient as well as the singularities of the joint [1].

The balanced single-lap bonded joint configuration study and its geometrical characteristics are shown in Fig. 1 and Table 1 and fig 2 shows the actual single lap bonded/bolted joints [2].

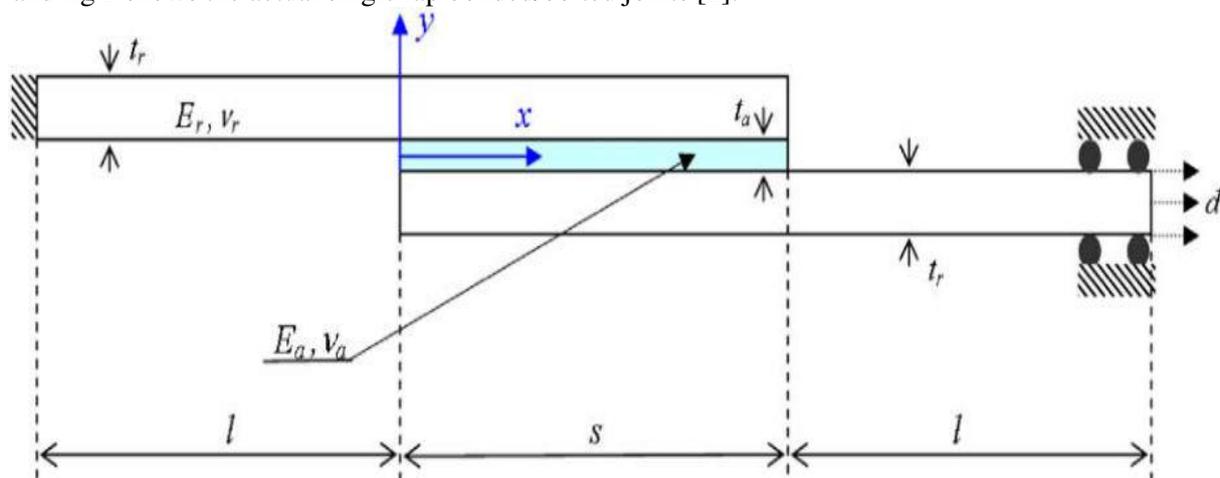


Fig.1. 2D bonded joint configuration [1].

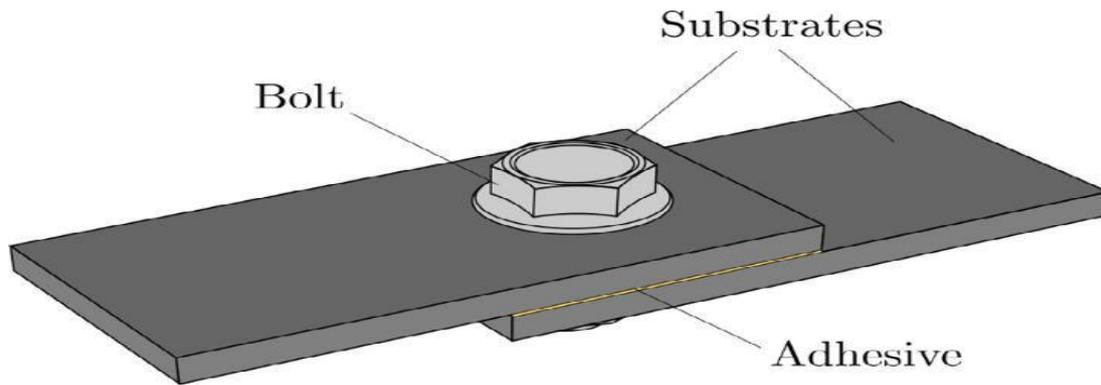


Fig.2. Actual Single lap bonded/bolted joint [2].

Table 1:2D bonded geometrical parameters

L (mm)	S (mm)	t_r (mm)	t_a (mm)
30	25	1.6	0.1

2.2. Hyper elastic adhesive:

Hyper elastic material could be modelled with numerous existing thermodynamic potentials. The potentials may give different numerical results of joint stiffness and adhesive stress distribution. In this work, the third parameter C20 is introduced in order to examine its influence on the joint response [1]. Significant influence of the adhesive compressibility on the joint stiffness as well as adhesive stress distribution, in particular on peeling stress, is demonstrated. The introduction of C20 parameter lightly affects the mechanical responses of the bonded joints [1].

2.3. Tensile–shear loading device:

Generally, there are three typical stress states for the adhesive joint between FRP decks and steel girders:

- (1) Shear stress s : due to the composite action between FRP decks and steel girders in the longitudinal direction of bridge, the decks and steel girders tend to bend together to carry the traffic load. Thus, the adhesive joints are under the shear stress condition to transfer the loading from FRP decks to steel beams, as shown in Fig. 3a [7].
- (2) Tensile stress : In the transverse direction of bridge, loading on other traffic lanes causes up-lift forces on adhesive joints, which results in tensile stress, as shown in Fig. 3b ,and
- (3) Combination of the above two stress states with different ratios of contributions from tensile stress state and shear stress state [7].

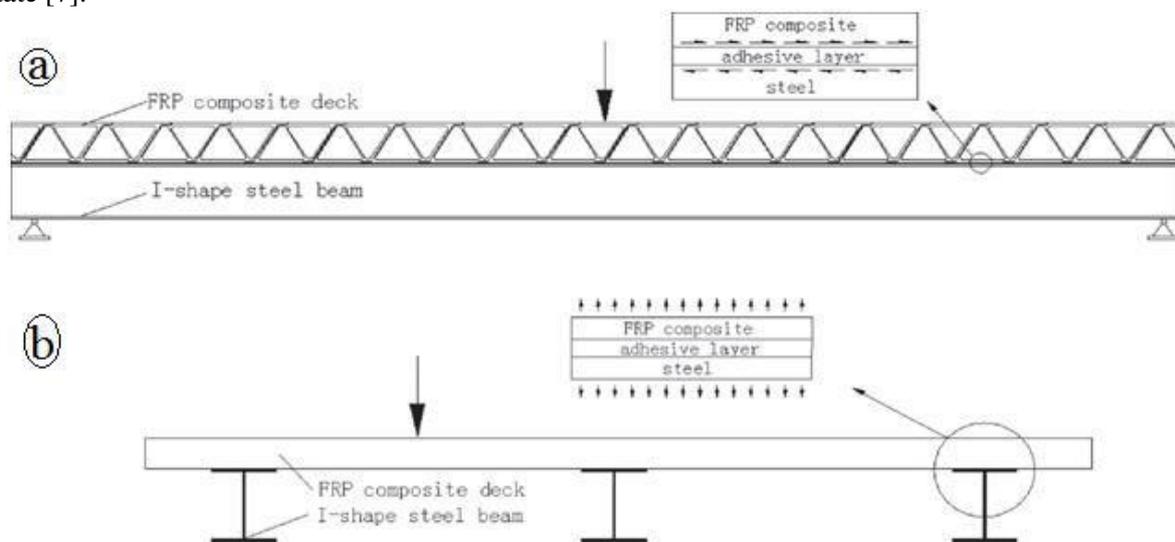
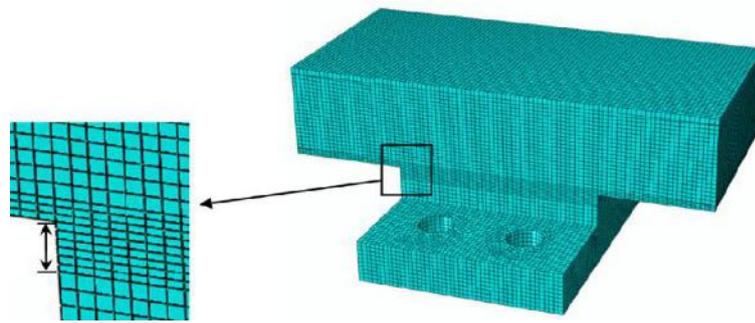


Fig 3. (a) Shear stress in the longitudinal direction, (b) Tensile stress in the transverse direction [7].

2.4. Finite element analysis:

For the stress analysis on the adhesively-bonded joints, it is usually approached by a closed-form analytical model or a finite element analysis (FEA). However, for the complex geometries and elaborate material models, a FEA is more suitable, which allows many tests to be simulated that would take too long to perform or be too expensive in practice, such as geometrical parameter study or selection of appropriate material properties [7]. Fig 4 shows the FE model of adhesive joints.



Figures/ Tables/Charts: (with numbering eg. 1, 1.1, 2, 2.1) at proper place in paper.

3. Environmental behaviour of adhesively bonded joints:

Structural adhesives are generally thermosets such as acrylic, epoxy, polyurethane and phenolic adhesives. They will be affected by environmental conditions and exhibit time dependent characteristics. The lifetime of adhesive joints are difficult to model accurately and their long-term performance cannot easily and reliably be predicted, especially under the combined effects of an aggressive environment and mechanical loading [5].

3.1. Moisture effects on adhesively bonded joints:

In the experiments, it is found that the strength of adhesive joints decreased as a function of the time for which the samples are in a humid environment. The adhesives absorb moisture more than most substrate materials and expand more because of the moisture. Water may affect both the chemical and physical characteristics of adhesives and the nature of the interfaces between adhesive and adherends [4].

A finite element-based methodology incorporating moisture history was used to predict the cyclic moisture concentration. A comparison was made between the new modelling methodology and a similar method that neglects the moisture history dependence [4]. It was found that the concentration predictions based on non-history dependent diffusion characteristics resulted in over-prediction of the moisture concentration in cyclic conditioning of adhesive joints [5].

The joints were exposed to high relative humidity (RH) environments and immersion in both tap and de-ionised water for up to a year before quasi-static testing to failure. In the model, the cohesive zone parameters determine the residual strength of the joints. The degradation of these parameters was related directly to the moisture concentration. The model was then extended to include degradation due to stress and more corrosive environments [5].

A progressive cohesive failure model to predict the residual strength of adhesively bonded joints using a moisture dependent critical equivalent plastic strain for the adhesive. A single, moisture-dependent failure parameter, the critical strain, was calibrated using an aged, mixed-mode flexure (MMF) test. The FEA package ABAQUS was used to implement the coupled mechanical-diffusion analyses required. Fig. 5 shows the predicted failure loads from the 2D and 3D MMF models using the continuum damage model with the different mesh sizes. This approach has been extended to butt joints bonded with epoxy adhesive. This involves not only a different adhesive and joint configuration but the high hydrostatic stress requires a more realistic yielding model [5].

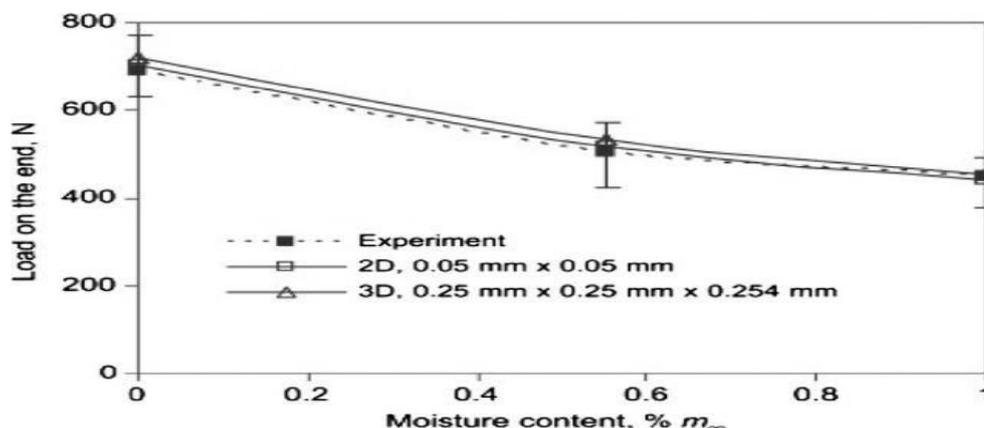


Fig. 5. Predicted failure loads from the 2-D and 3-D MMF models using the Continuum damage model with the different mesh sizes [5].

3.2. Temperature effects on adhesive joints

The tensile load capabilities of the Single Lap Joints bonded with a flexible adhesive that possesses pressure sensitive properties were experimentally investigated with respect to the applied pressure during the curing operation, and the experimental results were compared with the FEA results. A detailed series of experiments and FEA were carried out to assess the effects of temperature that an automotive joint might experience in service. Tests were carried out at -40 and $+90$ °C. It was shown that the failure criterion proposed at room temperature is still valid at low and high temperatures, the failure envelope moving up and down as the temperature increases or decreases, respectively. Fig. 6 shows the stress–strain curves for sheet steel at -40 , $+20$ and $+90$ °C along with the adhesive strain to failure at the corresponding temperatures [4].

In quasi-static tensile behaviour of adhesively bonded double-lap joints, composed of pultruded GFRP laminates and an epoxy adhesive, was investigated under temperatures ranging between -35 and 60 °C. They found that the failure mechanism changed with increasing temperature from fibre-tear to adhesive failure. The modelling results obtained using existing empirical models and FEA compared well to the experimental data in the examined temperature range. 3D thermal residual stresses occurring in an adhesively bonded functionally graded Single Lap Joints subjected to a uniform cooling [5]. They concluded that the free edges of adhesive–adherend interfaces and the corresponding adherend regions are the most critical regions, and the adherend edge conditions play more important role in the critical adherend and adhesive stresses. Systematically the mechanical properties of the mixed-adhesive joints, which are joints with a combination of a low-temperature adhesive and a high-temperature adhesive. Using an integrated combination of mechanical property evaluation and FEA, a logical method for the design and certification of adhesively bonded composite to steel joints for the marine industry. Calculated factors of safety for the sandwich design used here show that the joint has adequate strength to maintain structural integrity even after severe environmental exposure [5].

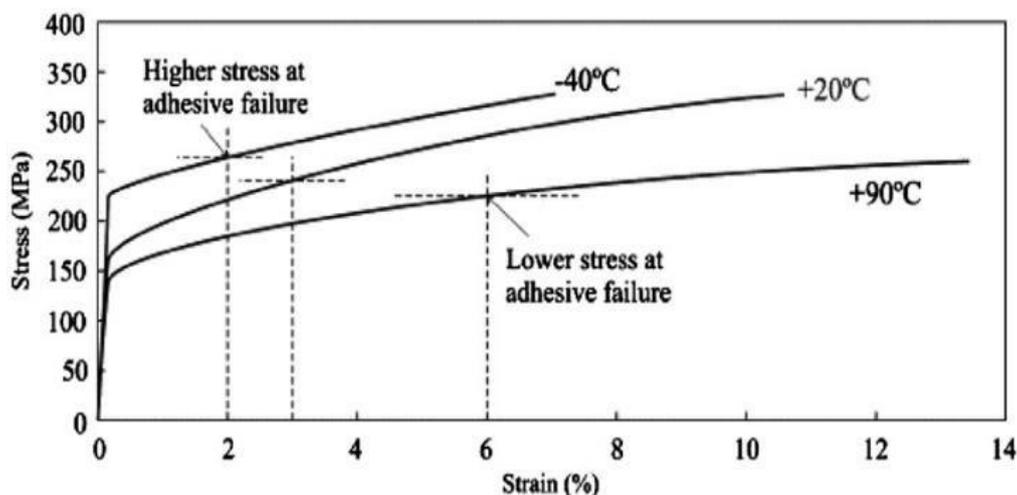


Fig. 6. Stress–strain curves for sheet steel at -40 , $+20$ and $+90$ °C along with the adhesive strain to failure at the corresponding temperatures [5].

It was shown that the shell-solid model can effectively predict the mechanical behaviour of the joint. Exponent Drucker–Prager or Von-Mises yield criterion together with non-linear isotropic hardening was used for the simulation of Double Lap joint tests [7].

4. BOLTED JOINTS:

4.1 Washers:

The static and fatigue experiments are conducted with hard round washers as well as both thin and thick square washers. The purpose of this study is to examine the effects of washer type as well as washer geometry on the performance of hybrid joints [3].

It is felt that a square washer will be more effective in either preventing or delaying the failure by fibre tear than a round washer, which does not provide lateral clamping in the outside corners of the lap ends. In addition to the experimental work, finite element analysis is performed to examine the effects of washer type on the peel stresses in adhesive joints with lateral clamping pressure [3].

The 25.4-mm square washer in the experiment, representing full clamping to the edges of the overlap area, gives a better performance compared to the 19-mm diameter round washer, representing partial clamping. Although qualitative, this result is in conformance with the analysis [3].

4.2 Mechanical fasteners:

Bolted connections represent the most common connection method in FRP structures. Substantial research has been carried out on bolted FRP connections, regarding the specification of the material and the geometrical disposition of the fasteners, on both the experimental and the numerical level [14]. It was shown that the material characterisation needs high attention to develop reliable design methods. Finite Element Analyses (FEA) considering frictional contacts between bolts and laminates showed that the number of pins, pitch distance, number of rows, row spacing, and hole pattern significantly influence joint performance. All earlier investigation used a purely deterministic approach to design bolted FRP joints [14]. Only recently, a point estimate method was applied for a probabilistic analysis of bolted connections considering input parameters as random variables where the failure load was taken as the load level at which the first significant change occurred in the slop of load–displacement curve. A wide variety of effects in FRP joints, including bolt-hole clearance, bolt-torque, and friction between laminates, secondary and tertiary bending in the laminates as well as the load distribution in multi-bolt joints were numerically investigated, mostly remain at the level of empiric data, and practitioners are provided with tables for the most common bolt configurations [14].

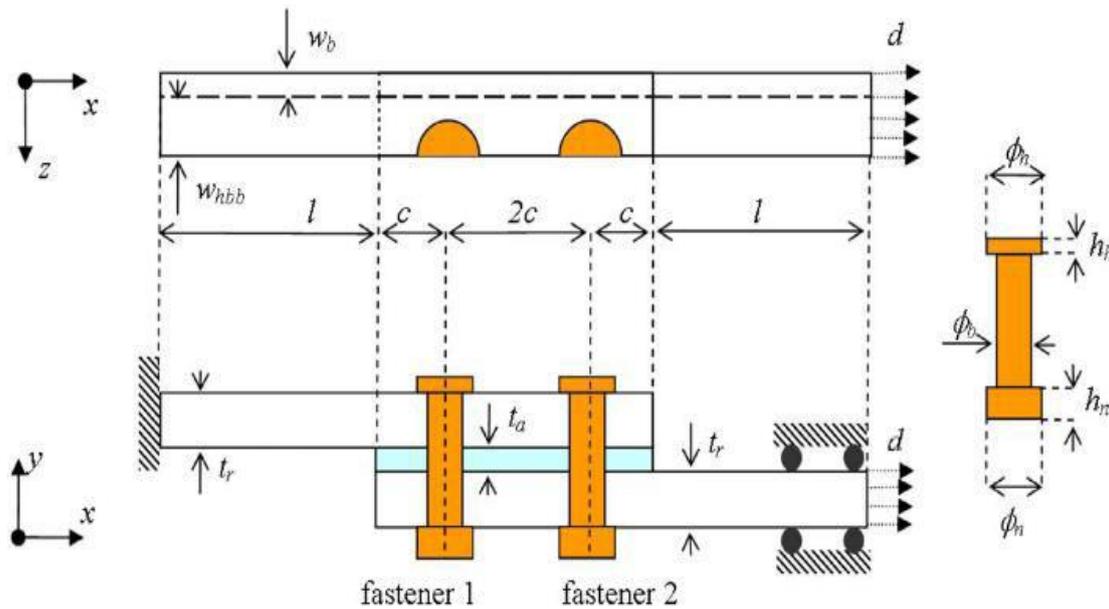


Fig.7 Mechanical fasteners (Nut and Bolt) [1]

4.3. Finite Element Analysis of bolted connection:

All the three connections involve 36 bolts in addition to the metallic connectors. In the finite element model, the bolted connections are simplified by using beam type elements (BEAM188) to represent the bolt fastenings for the connections [2-8].

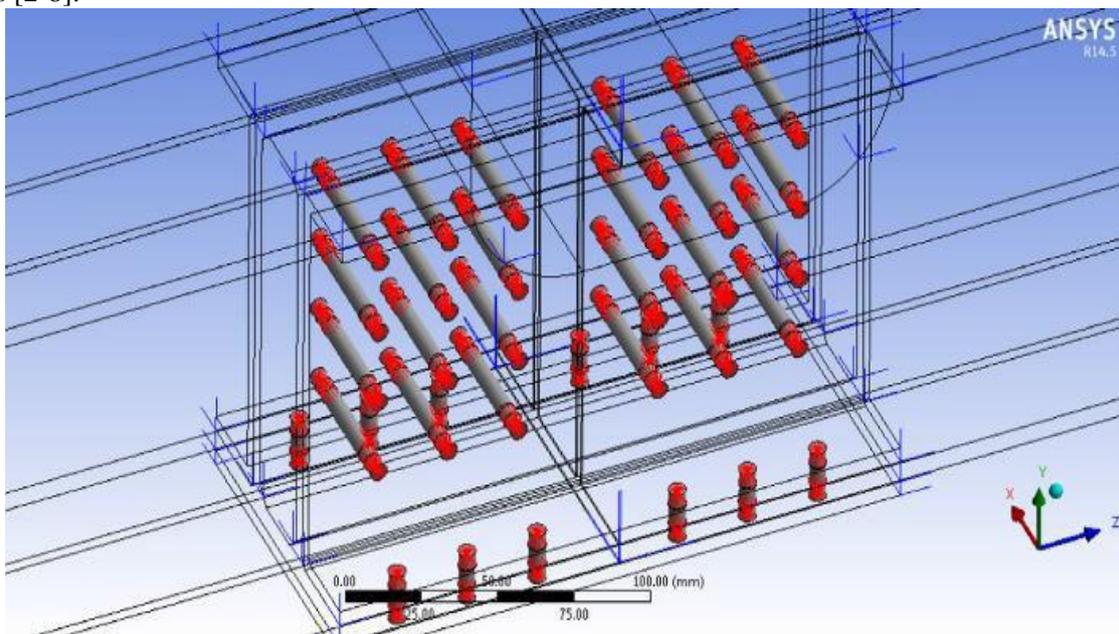


Fig. 8 Bolt connection modelled with BEAM188 elements [8].

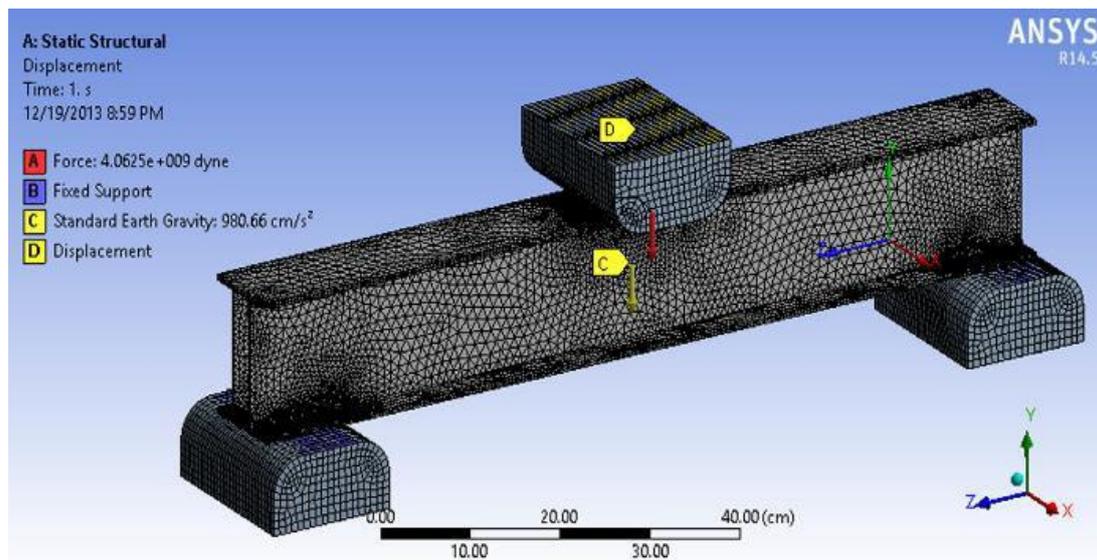


Fig. 9 BEAM188 mesh model [8].

Because of the large number of bolts involved in the problems, the bolts were modelled using beam elements instead of using 3D bolts, which would involve a massive number of contact and target elements (Fig. 8 & 9). This simplified the problem greatly for us by reducing the number of finite elements involved in the computation and immensely reduced computational time and memory usage [2-8]. All the results of the beam-beam connection analyses showed very good correlation with the experimental results establishing the suitability of finite element method in arbitrating the strength and stiffness behaviour of the GFRP joint connections [8].

4.4. Global sensitivity analysis:

A Global Sensitivity Analysis (GSA) was performed of the GHJM to quantitatively assess the importance of the various model input factors in load sharing [8-9]. Load sharing in the context of the current work is defined as the proportion of the total load transferred by the bolt to the overall load transferred by the joint. The term total is emphasized since load can be transferred by the bolt in two ways:

- Through friction between the bolt head and the substrate outer surfaces.
- Through a combination of friction and normal contact forces between the bolt shank and hole bearing surface.

The first type of bolt load transfer requires a clamp-up force in the bolt. Even when this load is extremely high (e.g. 8 kN), only a relatively small, pre-determined amount of load can be transferred in this way (assuming a coefficient of friction of 0.2, the bolt head load would be at most 1.6 kN in this case). The second type of bolt load transfer requires contact between the bolt shank and the hole bearing surface. This type is theoretically able to transfer a large amount of load, which increases as the joint deforms. The total bolt load is the sum of these two components and is equal to the bolt shear load in the adhesive centre plane [9].

5. CONCLUSION:

Due to various advantages of Fibre-Reinforced Polymer (FRP) decks, the FRP to steel composite girder system is being increasingly used in new bridge constructions as well as rehabilitation projects for old bridges. The comparison on failure modes confirmed that the surface pre-treatment can improve the bonding quality between FRP composites and adhesive layer, and the failure load of the adhesive joint closely related to the FRP delamination area. From the results and observations of the FEM and laboratory experiments, the following conclusions are made regarding the finite element analysis of bolted GFRP components and beam-beam connections:

- The provided configurations can sustain more loads at the joint due to a significant increase in the moment of inertia at the area. Thus, the damage pattern for the connected beam is different from that of the benchmark beam which splices during failure.
- In the beam-beam connection analysis, regardless of the configuration of specimen that was used, failure always emerged from the bearing failure of the bolt holes at the bottom of the joint connection.
- Using adhesive to bond the GFRP plate to the base of the joint connection, the bearing failure can be delayed and the joint can have strength close to that of a whole uncut beam.
- Modelling the bolts with beam elements instead of 3D bolt models gave competent results whilst saving computational time and memory. This study shows that finite element method can be effectively used to study the behaviour of bolted GFRP joint connections.

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**‘Sanjyot-2018’ National Seminar on
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Kopergaon, Dist- Ahmednagar, Maharashtra, India,**

A review on enhancement of tool properties through various treatments and surface coatings

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Abstract: *The main focus of this work is on improving the wear resistance and tribological properties of tools. Wear resistance of tools can successfully improved by surface-engineering techniques. Possible benefits and restrictions of different surface-engineering techniques are studied. In recent years, hard coatings have shown enormous potential for improving the tribological properties of contact surfaces. Mechanical surface treatment processes like micro-blasting, along with plasma nitriding can improve the tribological properties and adhesion of coating systems. Intermediate treatments with coatings improve erosion and corrosion resistance by preventing formation of localized erosion and corrosion. Effect of Nitriding and process parameters of nitriding was compared. Hard coatings by Physical Vapour deposition (PVD) techniques on various substrate materials mostly reduces wear resistance depending upon factors like coating adhesion and substrate preparation. Hard Coating improves wear and galling resistance in forming application. Micro blasting as an intermediate treatment cleans the coating surface and removes the pin holes.*

Key Words: *Physical Vapour deposition (PVD), Plasma nitriding, Wear, Substrate, Adhesion*

1. INTRODUCTION:

Over the past few years, extensive research has been shown the effect of low-temperature treatment on the performance of tool steels. In metal forming industry, tool is exposed to very complex and surface demanding conditions, which are the result of different effects (mechanical, thermal, chemical or tribological loading) and require well defined mechanical and especially tribological properties. Therefore tool materials need to fulfill many requirements, which, to a certain extent, are not mutually compatible, i.e. high hardness and high toughness. Beside the materials intrinsic properties, tribological properties of the tool surface, including abrasive wear resistance, coefficient of friction and resistance to galling, will also determine the tools operating lifetime. Using different heat treatment processes and parameters, the microstructure of a tool steel and therefore its mechanical and tribological properties can be modified and optimized for a selected application [1]. Hard coatings have been used in many industrial applications including cutting tools, forming tools, and machine components, The effects of various pre, intermediate and post-treatments on the properties and performance of the coatings were studied [1-2]. Surface quality of the substrate and coating surface play important roles in deciding the performance of a coating system. In particular, optimization of the substrate, surface treatment, and deposition parameters is essential to obtain a coating system with good adhesion and working lifetime [2]. Nitriding alone always improves the hardness value and wear resistance [3] but surface pre-treatment by processes like micro-blasting, polishing, and buffing, along with plasma nitriding can improve the tribological properties and adhesion coating systems [1-2]. Thus various properties of material gets affected depending upon process parameter and hence finding the effect of specific treatment on specific material is to be investigated.

2. EFFECT ON MECHANICAL PROPERTIES:

Mechanical properties such as tensile strength, compressive strength, Hardness etc play a vital role while selecting a material for an application. Material with high strength and low cost is always first choice so enhancement of strength by surface treatment can be applied subjected to fulfill economical constraints. A combination of higher austenizing temperature, deep-cryogenic treatment and/or plasma nitriding results in increased surface hardness. A results was compared for substrate S390, two specimens hardness gives conclusion that nitriding gives better hardness. S390 + Tempering at 540/540/510/2 °C/h and S390 + Tempering at 540/540/2°C/h + Nitriding at 520/2°C/h was two specimens and their hardness 66.8 and 67.0 HRC respectively [1].

Hardness values of the nitrided samples indicate that nitriding has the potential to offer good wear resistance to the tool steels by increasing their hardness. Figure no.01 shows that hardness of specimen increases almostly twice for nitriding while figure no.02 shows pre-nitriding and then coating versus hardness value. Except for TiC coating all other coatings shows increased hardness value along with nitriding as pretreatment ^[3].

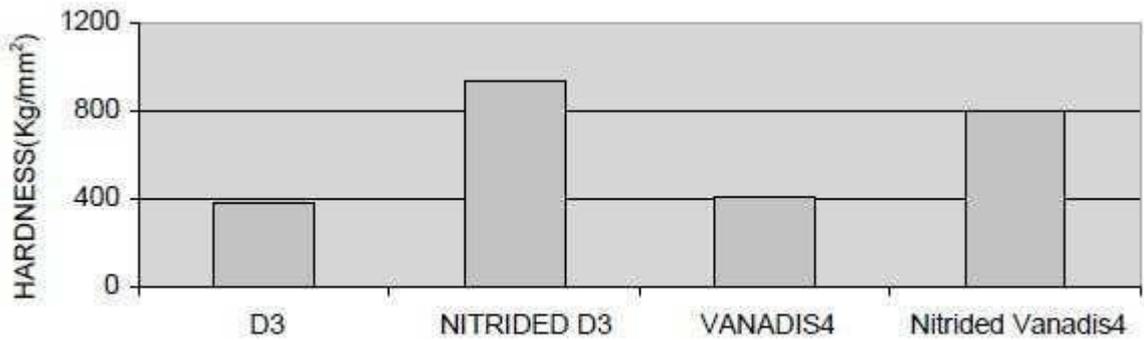


Figure no. 01. Effect of Nitriding on Hardness ^[3]

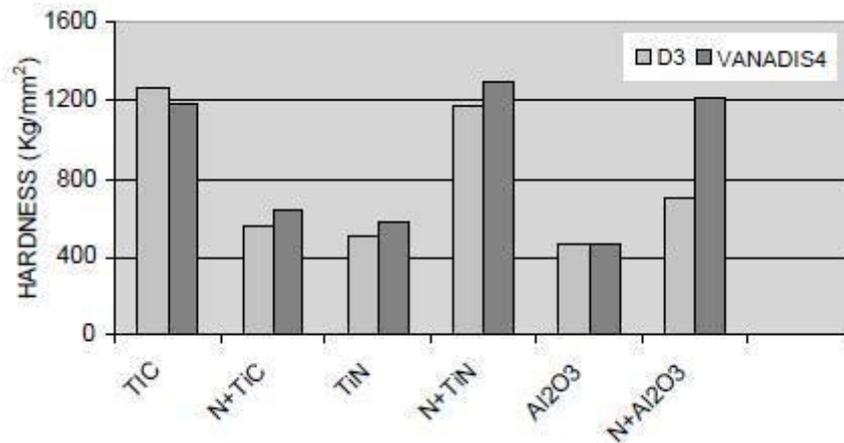


Figure no. 02. Effect of Pre-Nitriding+Coating on Hardness ^[3]

The nitro carburized layer considerably improves load capacity and adhesion strength of the nitrocarburizing-AlCrN composite coating as a result of the thicker nitro carburized layer and the gradient in the hardness profile of the duplex coating. Hence, the duplex coated samples show higher wear resistance when compared with the single PVD coated sample. The main wear mechanisms of the duplex coated samples are oxidation wear or oxidation wear and adhesion wear, whereas the main wear mechanisms of the single PVD coated sample are spalling and chipping wear as well as oxidation wear. Therefore, nitro carburizing pretreatment on SKD 11 cool-work tool steel before PVD is a suitable process for improving the mechanical and tribological properties of materials ^[10].

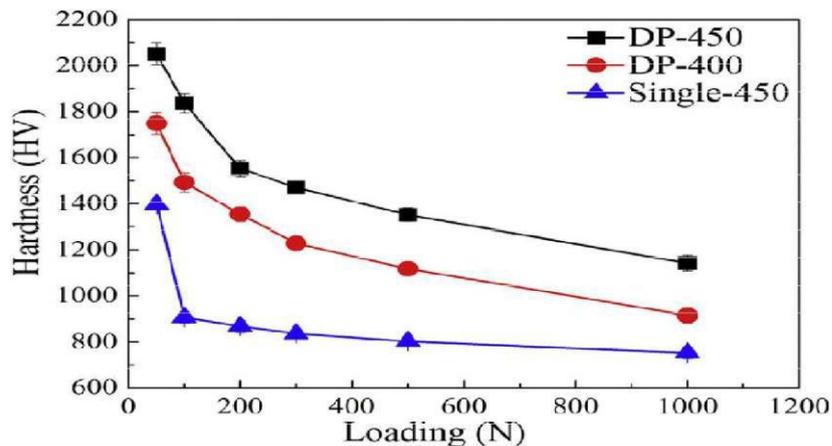


Figure no. 03. Surface hardness of the duplex coatings under various testing loads ^[10]

Coating deposited at substrate temperature of 400 °C and 450°C was named as DP-400 and DP-450 respectively. Coating deposited on the surface of substrate without plasma nitro carburizing pretreatment was labeled as Single-450. At constant load duplex treatment with coating deposited at high temperatures shows elevated hardness value ^[10]. Mechanical properties for the coating studied is as per shown in Table 1. The data presented show that coatings have a similar hardness within the range of 28–32 GPa. The highest Young Modulus is for AlCrN coating ^[5].

Table 1 Mechanical Properties of the Deposited Samples ^[5]

Samples	Hardness(GPa)	Young Modulus(GPa)
AlCrN	31.2±6.2	600±90
AlCrNbN	32.1±6.4	534±81

Deep draw ability of the ultra-high strength steel sheets is not low; the occurrences of the seizure and delayed fracture are problem. The quality of deep drawn sheets is influenced by the drawing conditions. The use of lubricant is effective in the prevention of the occurrence of seizure. However the high performance lubricant having high density and extreme pressure agent is not suitable in the industry. In this study, coated dies with rust-preventive oil were compared. Although the seizure occurs in the no-coating, the seizure was prevented by the coated dies ^[12]

3. EFFECT ON TRIBOLOGICAL PROPERTIES:

Wear tests were carried out using a ball-on-disc wear tester. The test was conducted at the room temp. of 27 °C, and under dry sliding conditions. As shown in figure no. 04 wear rate of AlCrN is high. It is due to the presence aluminum in the coating reduces the hardness and increase the wear rate. Wear rate of TiN is low due to the presence of Nitrate. Wear rate of TiAlN is higher than TiN but lower than AlCrN [4].

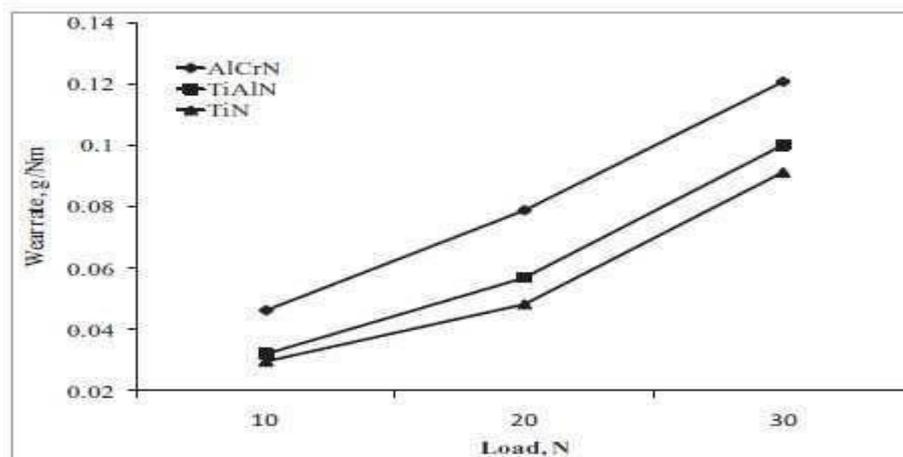


Figure no. 04. Wear rate of TiN, TiAlN, AlCrN coated SS304 ^[4]

Comparing the wear track profiles of the three coatings (CrN, AlCrN & AlTiN), it can be found in Figure no. 05 that the high hardness AlCrN coating exhibited a larger wear depth than the CrN coating with a much lower hardness. Among these three coatings, the CrN coating exhibited the best wear resistance, whereas the AlTiN coating exhibited the worst wear resistance ^[9]

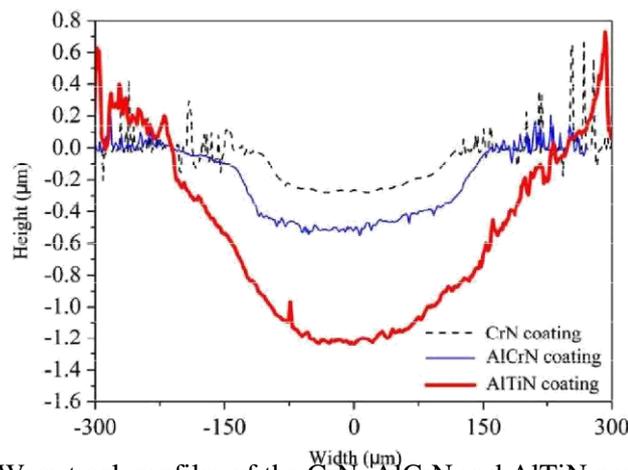
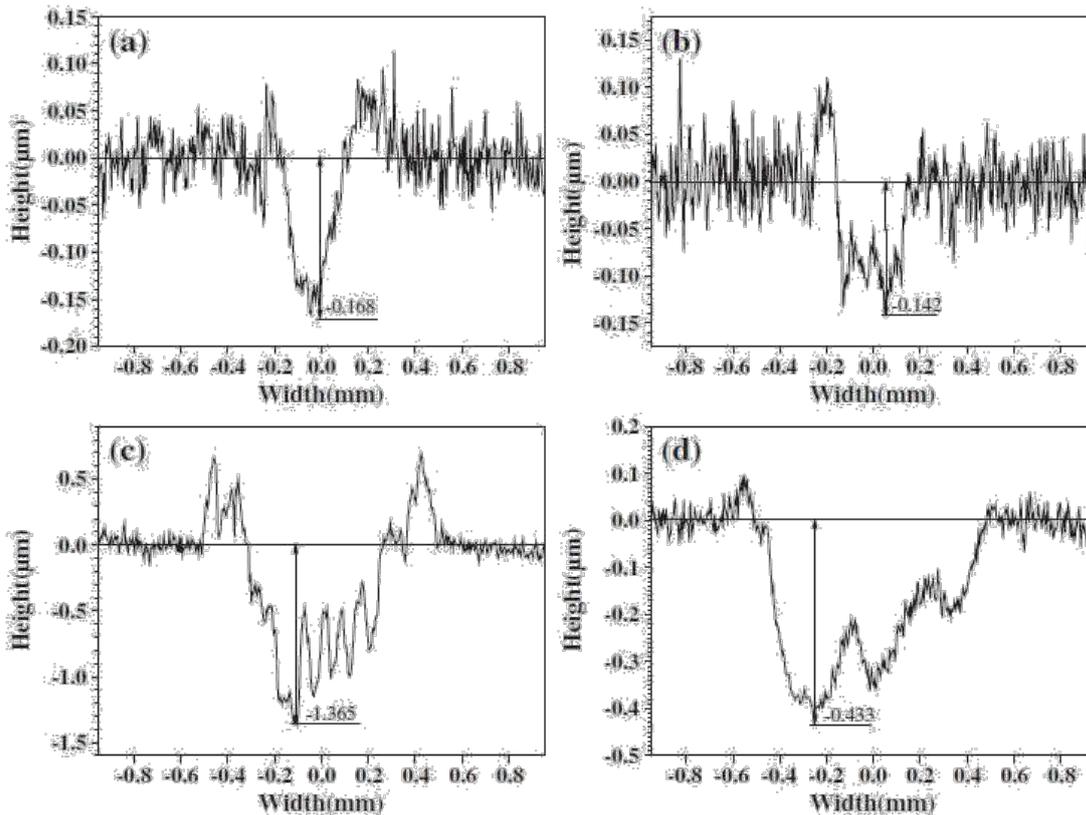


Figure no. 05. Wear track profiles of the CrN, AlCrN and AlTiN coatings ^[9]

High erosion resistance to molten aluminum was achieved using the combination of plasma nitriding and intermediate treatments. Plasma nitriding generally increases residual compressive stresses near the surface in an area defined in the nitriding diffusion zone. At 100- μm -thick nitriding layer, the compressive stresses help to reduce crack growth rate during thermal cycling, which improve the thermal fatigue behavior of the coating. Likewise, to prevent the direct contact between the base metal and molten aluminum, coating defects should be covered. Intermediate treatments (micro-blasting or plasma etching) of the coating suppress the growth of coating defects and help to cover coating defects at subsequent deposition of the second layer. Consequently, the combination of plasma nitriding and intermediate treatment of the coating improved erosion resistance in molten aluminum [2].

Figure no. 06 shows the sectional morphologies of wear track on the coating, in which the maximum wear depth was marked. It was observed that the wear tracks on TiN and TiAlN coatings were uneven but relatively smooth, but AlTiN coating showed relatively rough ground or bigger grooves, and CrAlN coating owned the



smoothest wear track among the four coatings. The obvious different sectional morphologies of these coatings must be produced by different friction and wear behaviors [6].

Figure no. 06. The sectional morphologies of wear tracks on the coatings: (a) TiN, (b) TiAlN, (c) AlTiN, (d) CrAlN [6]

Pre-Nitriding of coating the steel substrate, deposited by PVD process, leads to improved friction and wear behaviour. Nitriding process improves load carrying capacity which leads to the improved tribological behaviour of the coated system [11].

4. EFFECT ON COEFFICIENT OF FRICTION:

Coefficients Of Friction (COF) of the CrN, AlCrN and AlTiN coatings is as shown in figure no. 07. In the transition stage, which was characterized by a steep increase in slope, the CrN coating presented the lowest value of COF while the AlTiN coating exhibited the highest one. The force required to deform and fracture the asperities mainly contributed the friction force in this stage and thus a higher coating hardness would cause higher friction force. When the steady stage was reached, the COF of the CrN coating leveled off, the COF of the AlCrN and AlTiN coatings, in contrast, decreased gradually. It can be probably attributed to the different debris behaviour of the coatings [9].

Steady-state COF value for the COF of the AlCrN coating in the reciprocating sliding wear tests decreased with increasing normal load, as shown in Figure no. 08(a). The COF of the AlCrN coating in the ball-on-disc tests were shown in Figure no. 08(b), it was found that the period of transitional stage decreased while the steady state COF value increased with increasing sliding velocity [8].

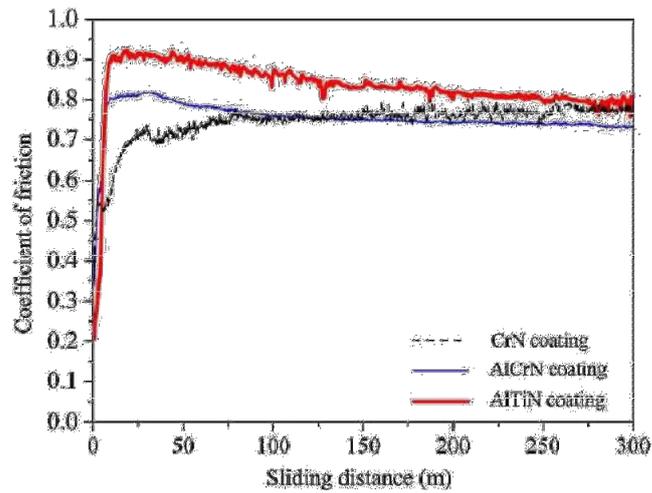
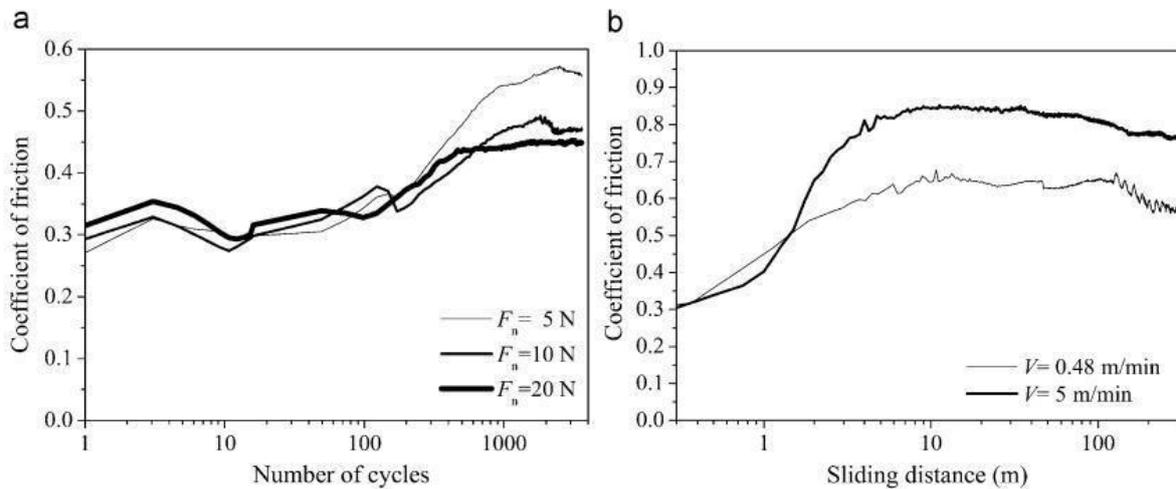


Figure no. 07. Coefficients of friction of the CrN, AlCrN and AlTiN coatings ^[9]

Figure no. 08. Coefficient of friction of the AlCrN coating: (a) reciprocating sliding tests and (b) ball-on-disc tests ^[8]



The friction behavior of the coatings in interaction with SiC ball as counterpart is shown in Figure no. 09. The dependency of friction coefficient was evaluated on the number of cycles and the standard number was 12,000. It showed that the friction coefficients of the four coatings possess similar feature: the first part represented run-in with rapid increase of the value, while the second part was the relative steady-state wear regime after about 1800 cycles with obvious fluctuation. The transitory decreasing during run-in period maybe aroused by the SiC counterpart itself rather than the coatings. With rapid increase of the wear rate of the ball, wear debris could arouse the sharp increase of the value until the friction reached a steady-state. The fluctuation in the second period was attributed to an accumulation of wear products in the contact zone ^[6].

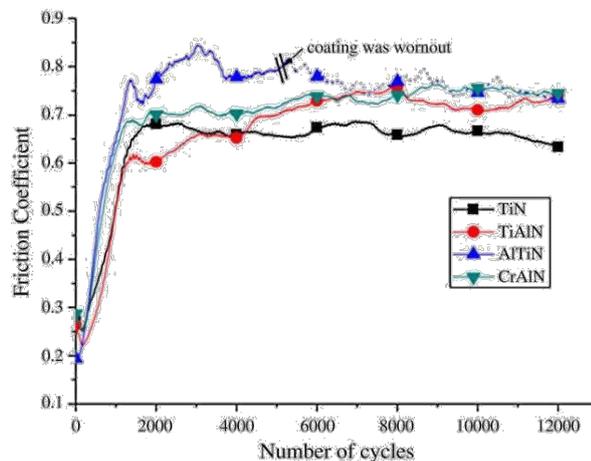


Figure no. 09. Friction coefficient as function of number of cycles ^[6]

5. CONCLUSION:

- With the discussion some of the concluding remarks can be stated:
- Plasma nitriding pre-treatment of substrates prior to the coatings resulted in superior adhesion strength.
- Intermediate treatment of coatings by micro blasting improves their erosion and corrosion resistance in harsh environments.
- AlCrN gives steady COF than that of CrN and AlTiN coating.
- Duplex treatment finds the advantage to improve wear resistance by avoiding local cold welding of wear debris.
- Treatment depending upon substrate material must be selected.

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**'Sanjyot-2018' National Seminar on
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Precision Agriculture Using WSN Node

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Abstract: *The present study there are different approaches for solutions that are being used to improve crop production. One of the methods that are showing a good effect in improving crop production and effective resource utilization is Precision Agriculture (PA). Using PA enables farmers know what amount of fertilizers, seed and other chemicals to use for their land and specific condition and also detect various disease which occurred at early stage in cotton plant like that pink bollworm disease and taking desired action required for disease . This makes PA an effective way for utilization of resources and improve production outcome. Wireless Sensor Network (WSN) in agriculture is showing progress. WSNs provide possibilities to sense and gather information of various environmental and crop conditions. However, it is a challenge for a farmer to know real-time data of a farm field therefore develop a wireless sensor network system for monitoring and control of various environmental parameters associated with precision agriculture like soil moisture, photosynthetic photon flux, leaf wetness, wind speed, humidity and etc.*

Key Words: *Precision Agriculture, wireless sensor network, pink bollworm disease, environmental parameters.*

1. INTRODUCTION:

Agriculture is one of the important sectors for the economies of countries. The sector contributes for nearly 30% of the continents Gross Domestic Product (GDP) and 70% of the continents population depends on agriculture to sustain their life. Facts from the World Bank about 'Agriculture in world' indicate that the agricultural sector has the potential to achieve the Millennium Development Goals (MDGs), reduce poverty, increase rate of employment and increase world

Agriculture is a major source of income for country and the country's economy highly depend on it. It accounts for half of the country's total GDP and more than 80% of the country's population depends on it. The government of country and other key stakeholders involved in agricultural work consider agriculture to be the main source of income, and a key role player for the country's socio-economic development.

However, despite the fact that agriculture accounts to be a source of income and a supply for population livelihood, periodic drought and other environmental disasters common happenings many farmers compelled to face. Therefore, to overcome challenges in the sector various policies and strategies have been designed and implemented. These efforts have been made to enable farmers improve their productivity and further to facilitate a preventive methods to avoid risk. For instance, one of the key approaches that are being used by various stakeholders in agriculture to improve the production and productivity of the farmers is having Agricultural Information Systems and make use of wireless Sensing (WS) technologies.

The objectives of the study include:

- It has to ability to monitor agriculture climate parameters(temperature ,relative humidity, Light intensity, Air pressure, soil moisture, water level
- It has to ability to detect various disease which are occurred at a cotton plant in early stages and taking desired Action against that disease. (Cotton pink bollworm)

2. LITERATURE REVIEW:

Proposed a system for farm monitoring and improving crop production.The agricultural scenario seems to be one of the most promising application areas for WSN due to the necessity of providing the agricultural production chain in terms of precision and quality. This involves a careful system design, since requirements are very strict,

battery life-time maximization, robustness, recovery strategies, network flexibility and configurability. This paper implements zig bee based wireless sensor network in agriculture such as monitoring of environmental conditions like weather, soil moisture content, soil temperature, soil fertility, weed detection, water level, monitoring growth of the crop, precision agriculture, automated irrigation facility and storage of agricultural products. The aim of this project is to monitor and maintain the farm from any part of the world through internet. Monitoring is done with the help of wireless sensor networks and all the control process is done with the help of the microcontrollers. Wireless cameras are used to feed live video of the farm to any part of the world. With the help of this project, modern technologies and new ideas can be implemented in the farm sector of our country. A farmer can see the real condition of his farm and also control his farm from any part of the world by logging into farming website. This makes the Indian farmers feel comfortable and reduces the risks involved in irrigation. The idea has the potential to attract entrepreneurs to invest in the agricultural sector. (B. Balaji Bhanu, 2014, p.34)

A xbee based wireless sensor network in agriculture such as monitoring of environmental conditions like weather, soil moisture content, soil temperature, soil fertility, weed detection, water level, monitoring growth of the crop, precision agriculture, automated irrigation facility and storage of agricultural products. The aim of this project is to monitor and maintain the farm from any part of the world through internet. Monitoring is done with the help of wireless sensor networks and all the control process is done with the help of the microcontrollers. Wireless cameras are used to feed live video of the farm to any part of the world. With the help of this project, modern technologies and new ideas can be implemented in the farm sector of our country. A farmer can see the real condition of his farm and also control his farm from any part of the world by logging into farming website. This makes the Indian farmers feel comfortable and reduces the risks involved in irrigation. (K.Sathish kannan, G.Thilagavathi, 2013, p.421)

Ravi Kishore Kodali et al. proposes Wireless sensor networks (WSN's) are being widely used to monitor various environmental and physical phenomena related parameters. WSN's are being used in various diversified fields. Agriculture and farming industry have been showing considerable interest in this technology in order to enhance productivity and be able to produce uniform quality yield, thereby enhancing profitability. India is one of the major exporters of mango in the world and profit can further be enhanced by many fold. This work presents a detailed report on various agricultural practices and mango farming statistics in India and suggests a WSN model for the WSN implementation in mango production. This model is used to monitor the amount of moisture content present in the soil (Ravi kodali, 2013)

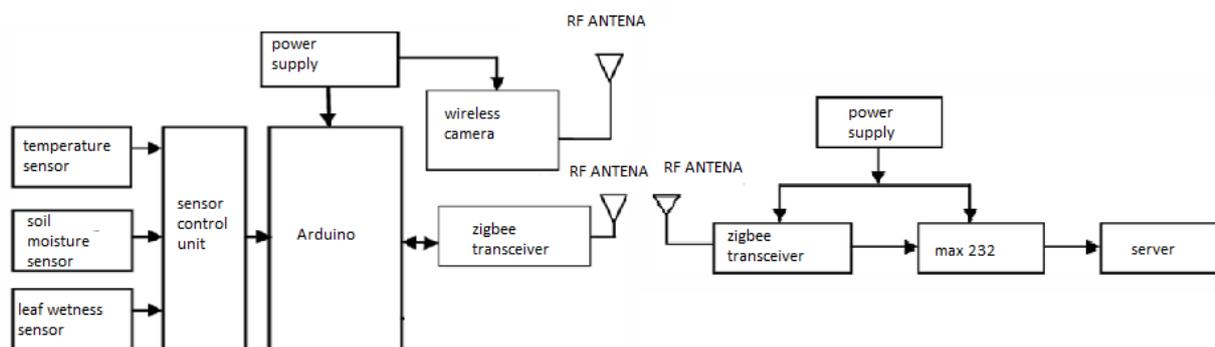
3. METHODOLOGY:

The present study uses Qualitative content analysis of selected Parameters.

3.1 CRITERION FOR SELECTION OF ENVIRONMENTAL PARAMETERS:

- Humidity is of importance as when levels are too low or high, agricultural products can suffer. This is due to transpiration where the water is evaporating from the leaf surfaces
- Temperature is a vital for agricultural environments. Agricultural produce is dependent on temperature as it will affect germination, sprouting, flowering and fruit development.
- Nitrogen is one of the main elements that contribute to the growth of a plant and is provided either via agricultural fertilizer and manure in soil based situations or liquid nutrient in a hydroponics situation.

BLOCK DIAGRAM:



4. BLOCK DIAGRAM DESCRIPTION:

Sensing module:

In this module contains various sensor like (temperature, humidity, leaf wetness, soil moisture, nitrogen) for gathering and sensed information related to the Precision agriculture and this gathered information will send to arduino for further processing and this information is a very essential for farmer getting desired action relate to the particular diseases.

Control module:

In this module contains arduino and it taking inputs from a variety of sensors, and controlling a motors, and other physical outputs and arduino will processed gathered information which are coming from sensing module accurately taken a correct action related to the Issue which are occurred on farm during monitoring

Communication module:

In this module consist all xbee devices which are very essential for doing communication into arduino and xbee wirelessly. Therefore information coming from Arduino will be transfer to pc server wirelessly using xbee shield module.

ENVIROMENTAL PARAMETRES:

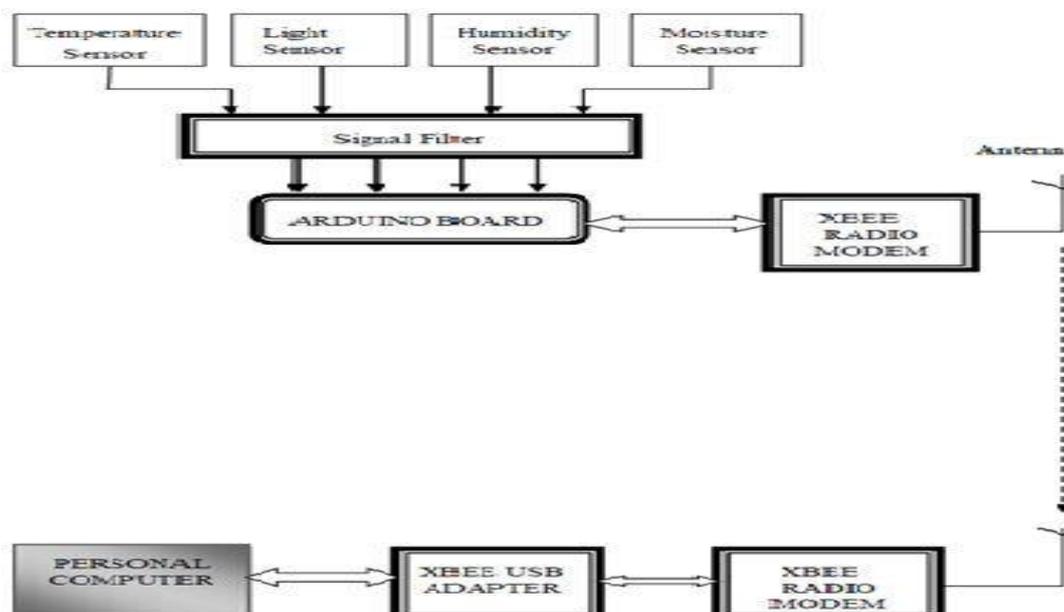
- Temperature
- Humidity
- Soil moisture
- Water level
- nitrogen
- leaf wetness
- carbon dioxide

THEORETICAL FRAMEWORK OF THE PRESENT STUDY:

This project will help in the development of the current situation of the agriculture by innovating the traditional way of agricultural farming. it will benefit the farmers who are working in the farms to ensure that their agricultural product is in good condition. the farmers will be able to acquire knowledge and skills in farming according to the latest technology in modern farming.

They will be able to keep track on the environment of farm remotely without going on field to ensure its favourable conditions. The automated system will aid them in controlling the environment of their farm without their interaction. They will be able to maintain the NPK content of the soil to provide proper amount of nutrients for the plants. It will only need less labour thus minimizing labour cost in the production. The production will be more efficient and time-saving according to the current trend and demands from the consumers. The automated system will help increase yield and produce high quality of crop.

Figure 1: Diagrammatic Representation OF Precision Agriculture using WSN Node



4.RESULTS:

SOIL MOISTURE TESTING:

Volumetric water content (VWC) is a numerical measure of soil moisture. It is the ratio of water to soil volume. To work out the volumetric water content, various tests were performed with soil to acquire the relationship between VWC and voltage output

Procedure for Obtaining VWC for particular SoilTypes:

- The soil to be tested was dried out at 180C for 24 hours. The soil was stirred periodically. This was done so that all moisture present in the soil was removed to get accuratemeasurements.
- Measuring cups were used to obtain a quantity of soil based on volume. Efforts were made to make sure the soil was homogeneous and compacted as it was measured. This soil was then filled in each of the containers with sufficient soil so the VG400-LV sensor probe could be fully inserted. Once measurements had been made for the volume of soil, the containers were weighed to make sure all containers had the same weight. As the soil was homogeneous, then equal volumes had equal weight.\
- Measured quantities of water were added to each of the 10 containers that had dry soil. For example, for 5% VWC, for 5 cups of soil used 0.25 cups of water were added. A scale was employed to measure the water, to make measuring moreaccurate.

The soil samples were mixed, covered and set aside for a few hours for the water to distribute evenly in each Sample

Water LevelTesting:

Water level measurements in mm adjacent to the probe are a numerical measure of interest. It is the height of the water in relation to the tip of the probe. Various tests were performed within the lab to work out the water level measurements in order to acquire the relationship between water level and voltage output.

Procedure for Obtaining WaterLevel:

- VG400-LV sensor probe was secured firmly in the clamp and stand. The probe was pointed downwards into an emptybeaker.
- Using the suction pipette, water was gradually added to each graduation marked on theVG400-LV.
- The millimeter was used to measure the voltage output at all the different water levels marked on theprobe.

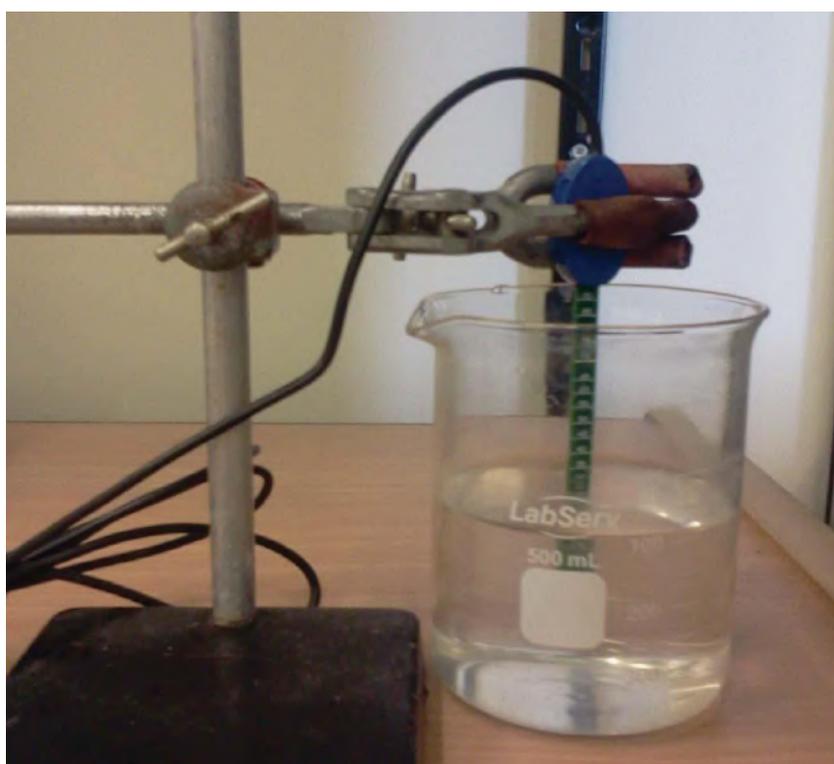


Fig3: VG400-LV Sensor Inserted into Beaker for Water Level Measurement

The sensor measures the dielectric constant of the water using transmission line technique and its output voltage is linearly proportional to the water level along the probe

PARAMETERS:

Temperature is a vital for agricultural environments. Agricultural produce is dependent on temperature as it will affect germination, sprouting, flowering and fruit development. Additionally transpiration rates go up as the temperature goes up, especially during the growing season. Particular agricultural products have suitable temperature ranges which allow for growth and development. temperatures below or above this range not only affect development and growth but can also stop processes essential for life such as the structure and functioning of enzymes. Additionally temperature effects also include the possibility of ice formation or dehydration. Temperature can cause changes indicative of possible changes occurring within other environmental factors such as relative humidity and soil moisture. therefore monitoring the temperature is of particular interest.

Humidity is of importance as when levels are too low or high, agricultural products can suffer. This is due to transpiration where the water is evaporating from the leaf surfaces. if humidity is below 50 percent for extended periods of time, growth can suffer as loss of water from leaves might be faster than replacement. due to this, plants growing in a dry environment can lose moisture overtime as it is easier for water to evaporate into dry rather than saturated air. Similarly if humidity is above 80 percent for extended periods

The presence of light and its duration is of significance as plants get energy from sun light. Sunlight has an effect on photosynthesis and the pigment chlorophyll that gives plants their green color it has an effect on growth processes of plants in agricultural environments, as strong sunlight causes greater transpiration whereas plants grown in darkness are seen as weak plants lacking chlorophyll.

Hence, a balance between light and dark for plant growth allows for both better photosynthesis and transpiration. Monitoring light sources plays an important role in decision making associated with the flowering, blooming and ripening of produce risk and spread of disease can increase]. In such cases the agricultural product can be affected significantly - particularly the flowering and fruit development. Different agricultural products have different transpiration rates.

Agricultural produce, whether grown in **soil or liquid nutrient**, absorbs water through the root system and is lost through transpiration. "Leaf senescence" can be brought on by environmental stresses such as when soil moisture or water availability is lacking; it is an adaptive response to aid plant survival by reducing water loss from transpiration and redistributing nutrients. The produce weight can be between 80 - 95 percent water where it can lose up to 98 percent of water intake via transpiration.

The reduction of **available water** results in roots failing to keep up with the rate of transpiration, therefore the plant responds with lower transpiration and photosynthesis through stomata response suffers. Where water is not limited, however, transpiration tends to increase and this has an effect on the amount of marketable product that can be obtained. Water is necessary for osmosis. . The rate of water loss depends on the condition of soil, air flow, relative humidity and temperature of the environment.

Overly moist soil causes damage to the roots. A plant with damaged roots has problems extracting water and essential nutrients and will eventually wilt and die over a period of time. Therefore, water is needed for agricultural products so that it has sufficient for the growth and life process but not so much that damage is done.

Nitrogen is one of the main elements that contribute to the growth of a plant and is provided either via agricultural fertilizer and manure in soil based situations or liquid nutrient in a hydroponics situation. Investigation is planned for integrating the measurement of nitrates in water sources near agricultural environments. A shortage of nitrogen can mean stunted growth and leaf yellowing. An excess of nitrates will affect the fruiting or seed development. This is also of interest due to the health concerns connected with nitrates for example Methemoglobinemia and its fatal consequence in infants caused by nitrate contamination.

Novel planar electromagnetic sensors have been fabricated and tested to allow for the detection of dangerous contamination in water sources such as nitrates. There is some desire to interface the novel planar electromagnetic sensor to detect water contamination via a WSN to allow for environmental monitoring.

6. CONCLUSION:

The performance of the system will be monitoring by using the parameters like soil moisture, humidity, water level, and nitrogen level and leaf wetness and also detect various disease which occurred at early stages in plant and taking desired action for that particular disease. For better efficient system the topology and routing protocol choose accurately. The system shows that how the precision agriculture done using wsn node.

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**‘Sanjyot-2018’ National Seminar on
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Crime against Woman Analysis, Visualization and Prediction

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Abstract: *Crime against women now a day has become problem of every country around the globe many countries are trying to control this problem. Preventive actions are taken to decrease the increasing number of cases of crime against women. A huge amount of data set is generated every year on the basis of reporting of crime. This data very useful in while analyzing and predicting crime and help us prevent the crime to some extent. Study of crime data can help us analyze crime pattern, inter-related evidences & important unseen relationships between the crimes. That is reason data mining can be countless assistance to analyze, visualize and predict crime using crime data. Classification and correlation of dataset makes it simple to understand similarities and dissimilarities amongst the data objects. We group data objects using clustering method. Crime data is classified on the basis of some predefined condition. Here classes are formed according to various types of crimes against women taking place in different states and cities of India. Crime plotting will help the administration to plan policies for preventing crime, further using data mining technique data prediction and visualization in various forms in order to provide better understanding of crime patterns.*

Keywords — *Crime Pattern, Crime against Women, Data Analysis, Data Mining, Data Prediction, Data Visualization.*

1.INTRODUCTION:

Crime is a key issue where the highest importance has given by our government. Criminology is an important area that focuses the scientific and systematic study of crime and criminal behavior and law enforcement and is a process that aims to identify crime characteristics. It is one of the top most important areas where the application of data mining techniques can produce important results. Crime analysis, a part of criminology, is a task that includes exploration and detection of crimes and their relationships with criminals. Law administration agencies like that of police today are faced with huge volume of data that must be processed and transformed into useful information. The high volume of crime datasets and also the difficulty of relationships between these types of data have made criminology an appropriate field for applying data mining techniques. Identifying crime characteristics is the first stage for developing further analysis. The knowledge that is added from data mining methods is a very useful tool which can help and support police forces [1].

According to [2], resolving crimes is a difficult task that requires human intelligence and knowledge and data mining is a technique that can assist them with crime detection problems. The idea here is attempt to capture years of human knowledge into computer models via data mining. Now-a-days, the criminals are becoming technologically sophisticated in committing crimes [3]. Therefore, police department requires such a crime analysis tool to restrict crimes and to remain ahead in the eternal race between the criminals and the law enforcement. In the background of massive environmental changes and tests before the police, harnessing of information became next to impossible. The exchange of information among police agencies became very time consuming and therefore, not available in time of need. There no time and staffs for entering data in records manually. This is happening over a period of time all over the country in varying degree. In this scenario, therefore, it became increasingly difficult to coordinate information and come to any meaningful crime analysis. Investigation took a back seat and the image of police suffered. The police should use the current technologies [4] to give themselves the much-needed edge. Availability of applicable and timely information is of highest necessity in conducting of daily trade and activities by the police, particularly in crime investigation and detection of criminals. Police departments have been handling a huge amount of such information and huge volume of records. There is an urgent need to analyzing the increasing number of crimes as approximately 17 lakhs Indian Penal Code (IPC) crime, and 38 lakhs local and Special Law crimes per year. An ideal crime tool

should be able to identify crime patterns quickly and in an efficient manner for future crime pattern detection and action.

However, in the present scenario, the following major challenges are encountered:

- Crime information volume has been increased.
- Problem of identifying techniques that can accurately and efficiently analyze this growing volume of crime data.

Different approaches and structures used for record crime data. The data which is obtained is inconsistent and are incomplete thus making the task of formal analysis a far more difficult. Investigation of the crime takes long period due to complexity of problems. All the above challenges driven this work to focus on providing results that can enhance the process of crime analysis for identifying and reducing crime in India. The main aim of this work consist of evolving analytical data mining approaches that can systematically address the complex problem related to various form of crime. Thus, the main focus is to develop a crime analysis tool that assists the police in: To do crime analysis to detect crime patterns. Provide information to frame policies for crime prevention and reduction. Recognize and analyze similar crime patterns to reduce additional occurrences of similar incidence. The present work uses a mixture of data mining techniques that are linked with a common aim of evolving such a crime analysis tool. For this purpose, the following specific objectives were framed. To cleans and error free the crime dataset. To discover and improve clustering algorithms to identify crime patterns from historical data. To explore and develop classification algorithms to guess future crime behavior based on previous crime trends. To develop anomalies detection algorithms for identify variations in crime patterns.

2. LITERATURE SURVEY:

The existing no data mining detection on system of business rules and scorecards, and known fraud matching have limitations. To report these limitations and combat identity crime in real time, this paper proposes a new multi-layered detection system complemented with two additional layers: communal detection (CD) and spike detection (SD). CD finds real social relationships to minimize the suspicion score, and is tamper resistant to synthetic social relationships. It is the white list-oriented approach on a permanent set of attributes. SD discovers spikes in dummies to increase the suspicion score, and is probe-resistant for attributes [1].

This paper presents study of clustering techniques and its role on crime applications. This study also helps crime investigation department for better prediction and classification of crimes. Crime is a fascinating application where data mining plays an important role in terms of prediction and analysis. Clustering is the process of combining data objects into groups [2]. D.E. Brown (1998) developed a software framework called ReCAP (Regional Crime Analysis Program) for mining data in order to catch professional criminals using data mining and data fusion techniques [3]. An Optimal KD Model for Crime Pattern Detection Based on Semantic Link Analysis-A Data Mining Tool. Use of link analysis in data mining to help detecting the crime patterns and speed up the process of solving crimes. In our study, we have seen that how this data mining tool in knowledge discovery process learns the typical behavior (profile of serial killers by applying link analysis, and helps in detecting the offender movements [4].

Concern about national security has increased after the 26/11 Mumbai attack. In this paper we look at the use of missing value and clustering algorithm for a data mining approach to help predict the crimes patterns and fast up the process of solving crime [5]. Among a large set of crimes that happen every year in a major city, it is challenging, time-consuming, and labor-intensive for crime analysis to determine which ones may have been committed by the same individual. If automated, data-driven tools for crime pattern detection are made available to assist analysis, these tools could help police to better understand patterns of crime, leading to more precise attribution of past crimes, and the apprehension of suspects [6].

Data mining is a process of extracting knowledge from huge amount of data stored in databases, data warehouses and data repositories. Crime is an interesting application where data mining plays an important role in terms of prediction and analysis. Clustering is the process of combining data objects into groups. This paper presents detailed study on clustering techniques and its role on crime applications. This study also helps crime branch for better prediction and classification of crimes [7]. Developed a weighting scheme for attributes here to deal with limitations of various out of the box clustering tools and techniques. This easy to implement data mining framework works with the geospatial plot of crime and helps to improve the productivity of the detectives and other law enforcement officers. It can also be applied for counter terrorism for homeland security [8].

Crimes cause terror and cost our society dearly in several ways. Data mining can be used to model crime profiling. Here we look at use of clustering algorithm for a data mining approach to analyze the crimes patterns. Accordingly crime is divided into three type's heinous crime, non-heinous crime and special local laws violation [9]. Second estimation is to find which area categories are more sensitive towards, areas categories which are considered are slums, residential, commercial, VIP zones, travel points and markets. Third is to show distributions of each crime

type in every area category [9]. We use semi supervised learning technique in this paper for knowledge discovery from the crime records and to help increase the predictive accuracy [10].

3. METHODOLOGIES:

Fig. 1 Shows Methodology Used for crime pattern analysis. We started by collecting data from NCRB, then we pre-processed it. Some attributes in some places were renamed and in other they were eliminated. That data is then used further steps.

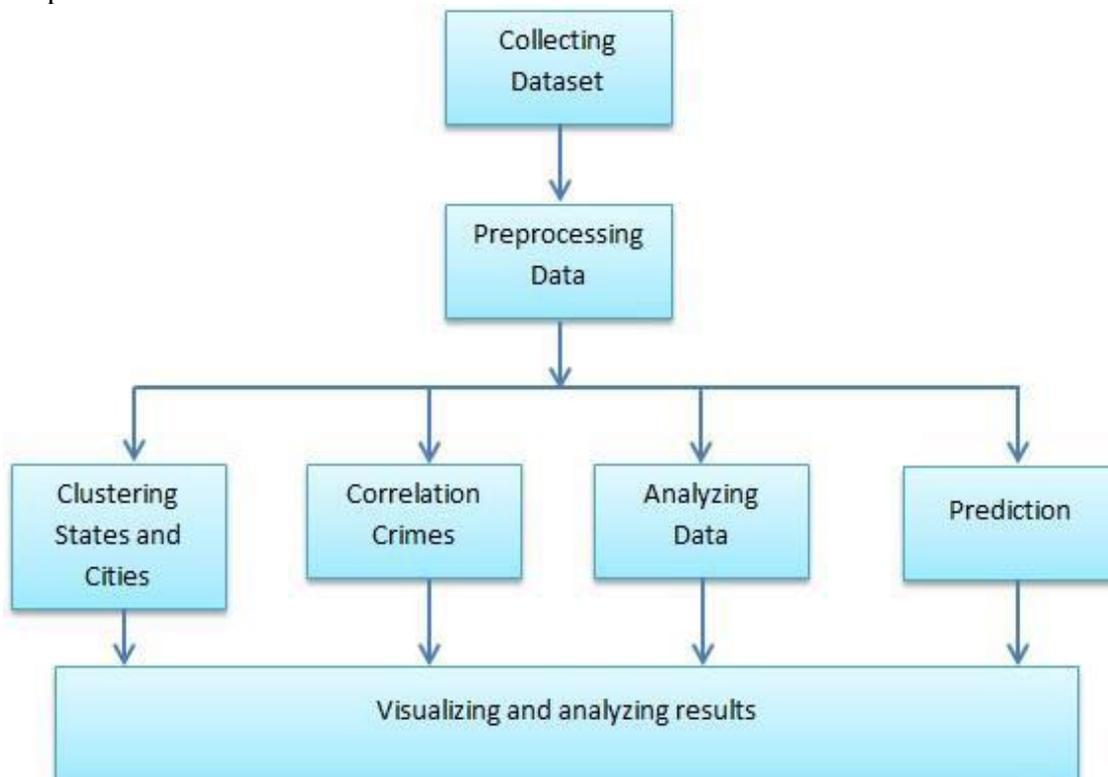


Fig.1 Methodology for crime pattern analysis

A. Collecting the Dataset

We have collected two types of datasets from the open government site www.data.gov.in dataset have the crime records of 10 years First data set is about all types of crimes happening across the all the states of country. Second data contains data of crimes occurring in all major cities of India. The National Crime Records Bureau of the Ministry of Home Affairs maintains statistics of different types of crimes occurring in the country. These generally tend to be under reported for different purposes but in the absence of any other source of such data, we have used data from their website. Two primary data sets are being used. One of data set had to be created by converting a pdf document to a spread sheet. These were 2014 data on the same set of crimes, but for cities. The types of crimes on which data was provided include the below 11 crimes:

- Rape
- Kidnapping and Abduction
- Dowry Deaths
- Assault with Intent to Outrage Modesty
- Insult to Modesty
- Cruelty by Husband or His Relatives
- Importation of Girls from Foreign Country
- Immoral Traffic Act
- Dowry Prohibition Act
- Indecent Representation of Women Act
- Commission of Sati Prevention Act

B. K-mean Clustering

K-means is one of the simplest unsupervised learning algorithms that solve the well-known clustering problem. The procedure follows a simple and easy way to classify a given data set through a certain number of

clusters (assume k clusters) fixed a priori. The main idea is to define k centroids, one for each cluster. These centroids should be placed in a cunning way because of different location causes different result. So, the better choice is to place them as much as possible far away from each other. The next step is to take each point belonging to a given data set and associate it to the nearest centroid. When no point is pending, the first step is completed and an early group age is done. At this point we need to re-calculate k new centroids as centers of the clusters resulting from the previous step. After we have these k new centroids, a new binding has to be done between the same data set points and the nearest new centroid. A loop has been generated. As a result of this loop we may notice that the k centroids change their location step by step until no more changes are done.

C. Correlation between different crimes

Correlations can be used to help make predictions. If two variables have been known in the past to correlate, then we can assume they will continue to correlate in the future. We can use the value of one variable that is known now to predict the value that the other variable will take on in the future. Pearson's correlation coefficient between two variables is defined as the covariance of the two variables divided by the product of their standard deviations. The form of the definition involves a product moment that is, the mean (the first moment about the origin) of the product of the mean-adjusted random variables; hence the modifier product-moment in the name.

$$r = \frac{cov(x, y)}{\delta_x \delta_y}$$

Where, cov is covariance and x is standard deviation of X . Pearson product-moment correlation coefficient is a measure of the linear correlation or dependence between two variables X and Y , giving a value between $+1$ and -1 , where 1 is called total positive correlation, 0 is no correlation, and -1 is called total negative correlation.

D. Prediction using linear regression

Linear regression is an approach for modeling the relationship between a scalar dependent variable y and one or more explanatory variables (or independent variable) denoted X . The case of one explanatory variable is called simple linear regression. In simple linear regression, we predict value of one variable from the value of a second variable. The variable we are predicting is called the criterion variable and is referred to as Y . The variable we are basing our predictions on is called the predictor variable and is referred to as X . When there is only one predictor variable, the prediction method is called simple regression. In simple linear regression, the predictions of Y when plotted as a function of X form a straight line. Linear regression consists of finding the best-fitting straight line through the points. The best-fitting line is called a regression line. The most commonly-used criterion for the best-fitting line is the line that minimizes the sum of the squared errors of prediction. The formula for a regression line is

$$Y = aX + b$$

Where Y is the predicted score, b is the slope of the line, and A is the Y intercept. The slope (b) can be calculated as follows:

$$b = rsX \frac{sY}{l}$$

And the intercept (a) can be calculated as

$$A = MY - bMX$$

Where MX is the mean of X , MY is the mean of Y , sX is the standard deviation of X , sY is the standard deviation of Y , and r is the correlation between X and Y .

4. RESULTS:

E. Clustering of cities and states

Clustering of crimes in cities and states was done using K-means clustering algorithm. The value of K which is total no of clusters to be formed was set to be 6 for cities and 5 for states. Fig. 2 is snapshot of clusters of crimes in cities based on crime attribute characteristics in data sets. Fig. 2 shows formed of different cities and there result of clustering of states using K-means algorithm on our data. Classify different States and UTs into different groups (We specified a 5 group solution, in order to help interpretation, and although one could theoretically have chosen a different number.) This grouping is done such that States and Union territories with similar characteristics (with respect to crime numbers) are grouped together. The first chart below tells us which States and UTs belonged to the 5 groups and the second chart following that gives information on the characteristics of these groups. The chart below can be used to determine the profile of each of the 5 groups. We can select (box around a group number) and click to find few lines highlighted. This chart gives the mean incidence scores on all crime variables for members in the 5 groups. Lower the mean score in the group, lesser that crime occurring in that group. Please note that the original variable labels were truncated in this graph.

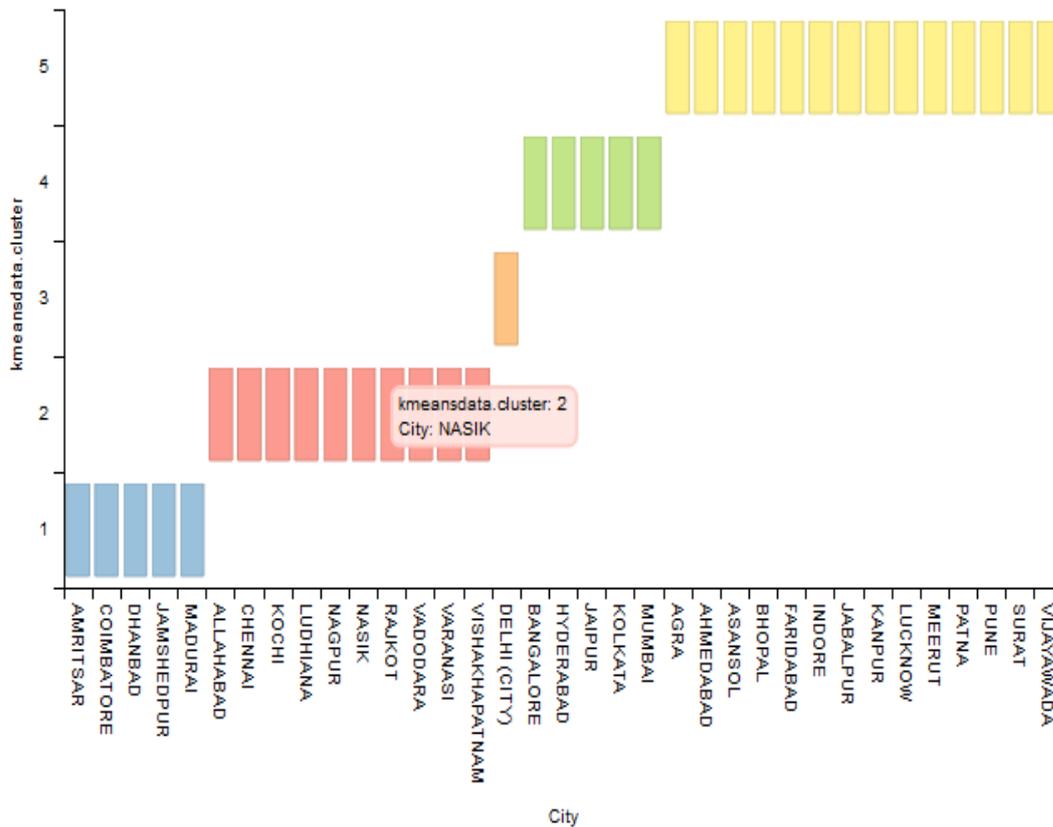


Fig.2 Cluster of Cities

The original variable labels are: Rape, Kidnapping and Abduction, Dowry Deaths, Assault with Intent to Outrage Modesty, Cruelty by Husband or His Relatives, Importation of Girls from Foreign Country, Immoral Traffic Act, Dowry Prohibition Act, and Indecent Representation of Women Act. Few Observations: Group 1: (Assam, Bihar, Gujarat, Uttar Pradesh) Highest incidence of Kidnapping and Abduction and Dowry Deaths. Group 2: (Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa) High incidence of Rape, Highest in Assault of Modesty and Importation of foreigners. Group 3: (Andhra Pradesh, Rajasthan, West Bengal) Highest incidence of Rape, Insult to Modesty, Cruelty by husband or his relative, Immoral Traffic Act, Dowry Prohibition Act and Indecent Representation of Women Act . Group 5 (Chhattisgarh, Delhi (UT), Haryana, Jammu and Kashmir, Jharkhand, Punjab and Tamil Nadu) relatively low (compared to groups 1, 2, and 3) but not the least levels (compared to group 4). Clearly, Group 4 States and UTs have the lowest incidence of crimes. These include Andaman and Nicobar Islands, Arunachal Pradesh, Chandigarh (UT), Dadra and Nagar Haveli, Daman and Diu, Goa, Himachal Pradesh, Lakshadweep, Manipur, Meghalaya, Mizoram, Nagaland, Pondicherry, Sikkim, and Tripura. So what we did in the context of States and UTs, we use k-means cluster analysis to classify different cities into different groups (Yet again, we specified a 5 group solution for interpretation purposes, although one could theoretically have chosen a different number.) This grouping is done such that cities with similar characteristics (with respect to crime numbers) are grouped together. The first chart below tells us which cities belonged to the 5 groups and the second chart following that gives information on the characteristics of these groups. As can be seen in Fig. 2 Delhi is in a league of its own, a lone member in a group. The chart shown in Fig. 5 can be used to determine the profile of each of the 5 groups. We can select (box around a group number) and click to find few lines highlighted. This chart gives the mean incidence scores on all crime variables for members in the 5 groups. Lower the mean score in the group, lesser that crime occurring in that group. Please note that the original variable labels were truncated in this graph. The original variable labels are: Rape, Kidnapping and Abduction, Dowry Deaths, Assault with Intent to Outrage Modesty, Insult to Modesty, Cruelty by Husband or His Relatives, Importation of Girls from Foreign Country, Immoral Traffic Act, Dowry Prohibition Act, and Indecent Representation of Women Act.

F. Correlation between crimes in cities and states

We used Pearson’s Correlation to find dependency between two crimes and visualized it through correlation matrix graph. This is shown in Fig. 3 and Fig. 4. We can consider following points for correlation graph:-

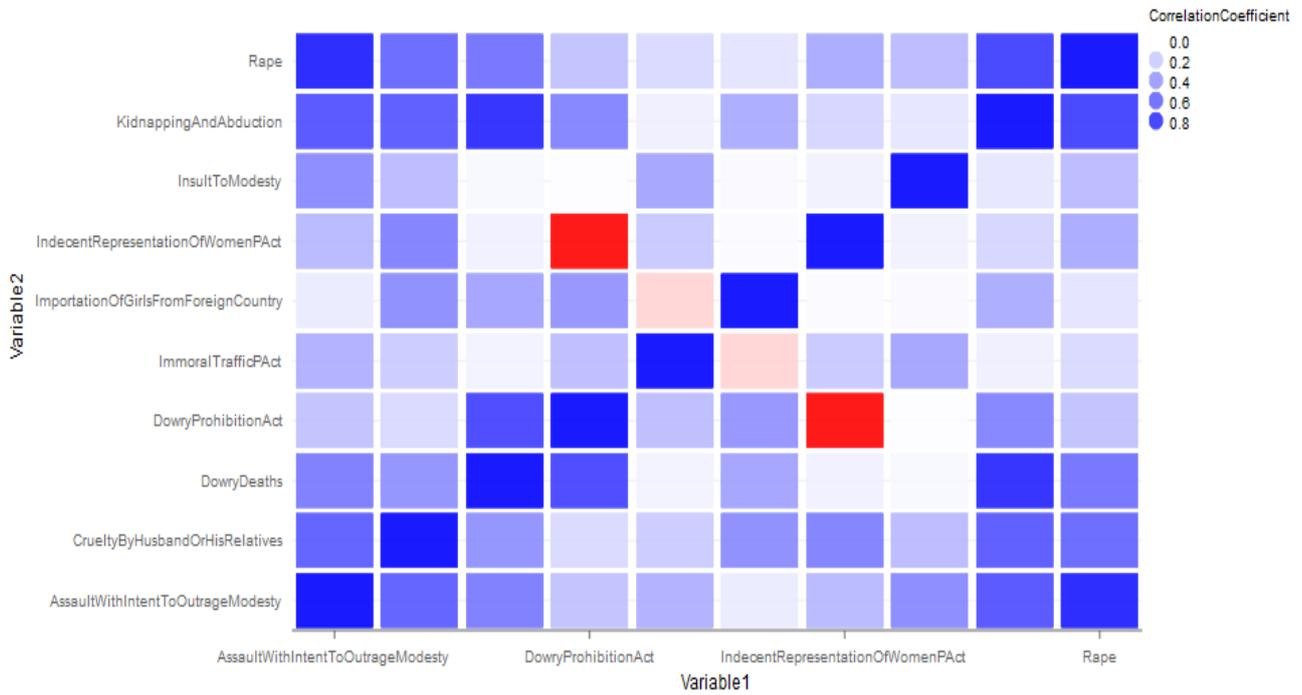


Figure 3: Correlation between crimes in cities.

- All types of crimes are there on X and Y axis.
- Colour intensity is representing how much a crime attribute is related to other crime.
- More blue a square shows highly correlative crimes and more less blue or more red shows crimes are negatively correlative.

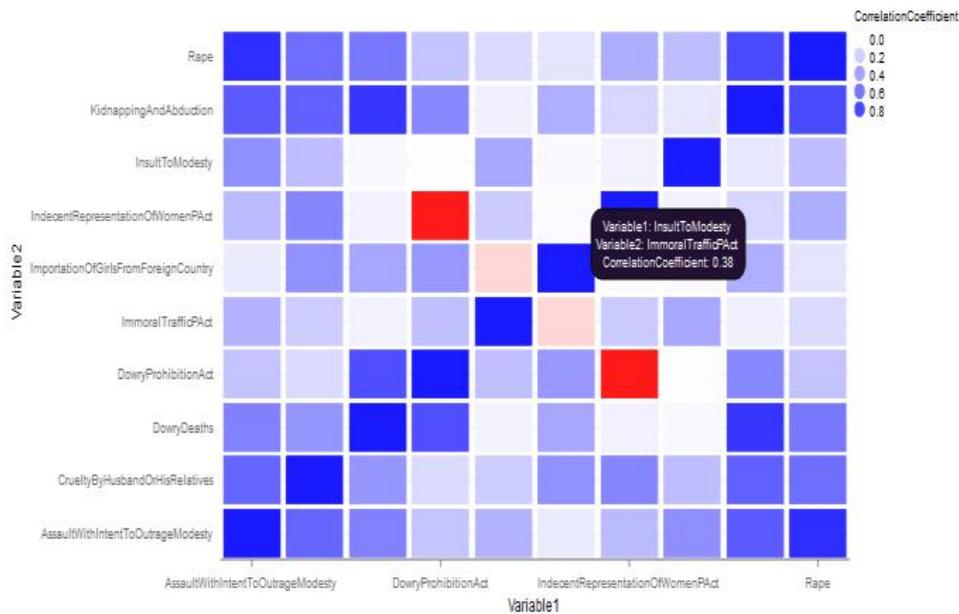


Figure 4: Correlation between crimes in states.

Correlation (dependence) between two variables X and Y, giving a value between plus 1 and minus 1 inclusive, where 1 is total positive correlation, 0 is no correlation, and minus 1 is total negative correlation. It is widely used in the sciences as a measure of the degree of linear dependence between two variables. The density of colour in graph varies as the value of Correlation factor. Blue colour indicates positive correlation and red indicates negative. As we have mouse over different blocks in the graph the results for that block in detail are shown.

G. Heat Map and shiny app visualization



Figure 5: Heat map for states

Fig. 5 shows heat map for our crime data. Due to availability of space all the names on x axis could not been displayed. This can be used for quick reference. Instead of finding numeric values you can directly see the statistics. For example we can quickly figure out which state(s) is (are) having highest value for kidnapping and abduction. For improvising the visualization we are using the shiny app. Crime rate of different cities based on the data attributes is shown in Fig. 8. As we can see in Fig. 8 one bar is provided to select crime. We can see this different crime rates in all the states. The rates are calculated for all the crimes in our data sets. FIG V2 and V1 The most reported and convicted crimes were under the domestic abuse category (Cruelty by husband or his relatives). It also appears that the same category has had the most dramatic rise in number of reported crimes over the years. This could be because either 1) Number of cases of domestic abuse has actually risen dramatically. 2) Women are beginning to speak up more about domestic abuse than before.

H. Crime Prediction

Fig. 6 shows the prediction of assault on women in Andhra Pradesh for next 5 years. We predicted the crime rate for each type of crime for each states and cities using linear regression model.

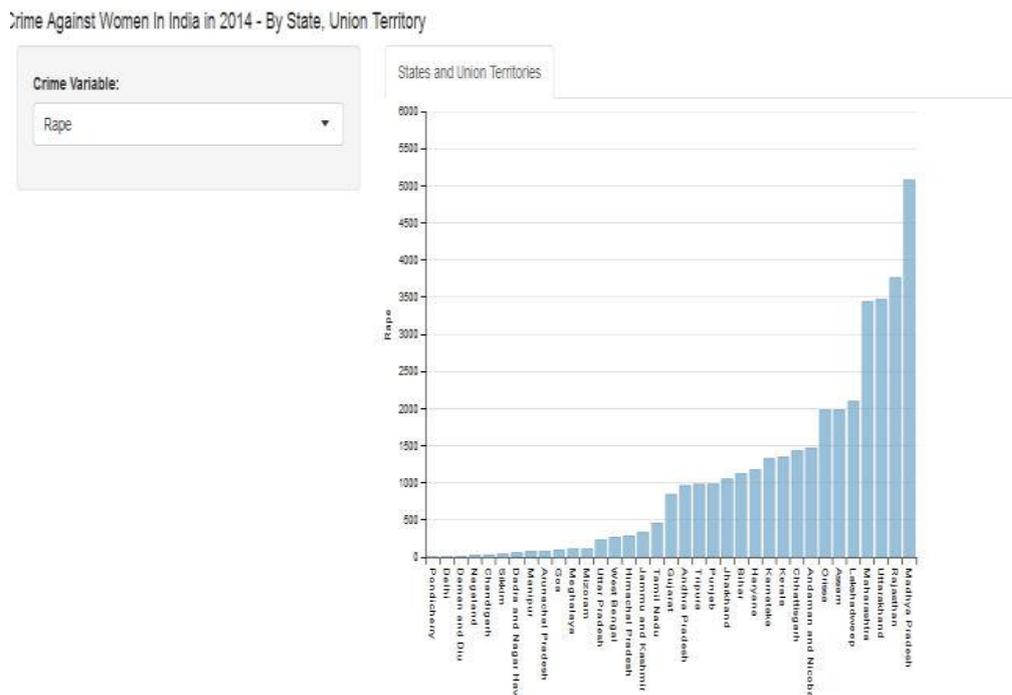


Figure 6: Visualization using Shiny app.

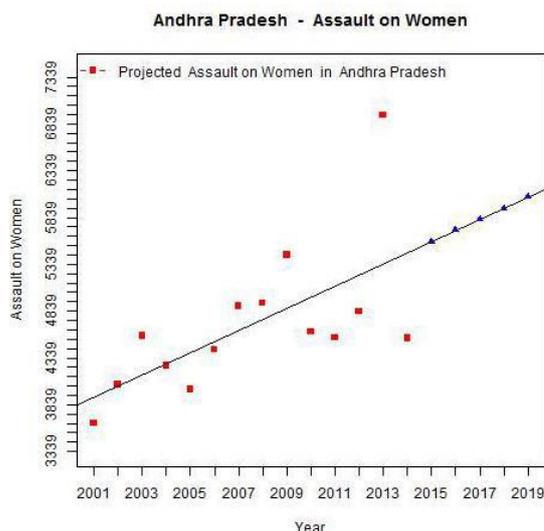


Figure 7: Crime prediction using linear regression.

X axis is representing the year of crime happening in any state or city and Y axis is represented by crime rate for the given state or city for corresponding year. Fig. 7 shows exact numeric data that was predicted for next five year.

1	Andhra Pr	5582.82	5701.42	5820.02	5938.61	6057.21
2	Arunachal	90.15	92.05	93.95	95.84	97.74
3	Assam	2546.4	2652.79	2759.19	2865.58	2971.98
4	Bihar	536.66	496	455.35	414.69	374.04
5	Chattisgar	2060.29	2078.34	2096.4	2114.46	2132.51
6	Goa	119.92	129.22	138.51	147.81	157.1
7	Gujarat	1224.87	1240.91	1256.95	1272.99	1289.03
8	Haryana	1171.35	1231.93	1292.51	1353.09	1413.67
9	Himachal	433.38	438.54	443.7	448.85	454.01
10	JammuKa:	2229.46	2275.81	2322.16	2368.5	2414.85
11	Jharkhand	382.54	382.36	382.19	382.01	381.84
12	Karnataka	4467.49	4663.53	4859.57	5055.61	5251.64
13	Kerala	4587.46	4758.95	4930.44	5101.93	5273.42
14	Madhya P	8274.29	8298.29	8322.29	8346.29	8370.29
15	Maharash	7428.76	7795.43	8162.1	8528.78	8895.45
16	Manipur	58.78	61.27	63.77	66.26	68.76

Figure 8: Crime prediction using linear regression (numeric data)

6. CONCLUSION:

We will be able to cluster various states, cities and crimes based on various attributes. Clustering different states and cities based on different crimes attributes from data sets. Also correlating different crimes based on changes some relation between data available. Our model, applied to crime data, can be used as a knowledge discovery tool that can be used to review extremely large datasets and incorporate a vast array of methods for accurate handling of security issues. Results and analysis on the datasets shows significant results and seems very useful. Knowledge discovered by clustering can be very useful for agencies to analyze the crimes in states and cities. It reveals that which states and cities are highly vulnerable to women crime.

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**‘Sanjyot-2018’ National Seminar on
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Noise Pollution: Present Scenario of Kopergaon City

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Abstract: Noise pollution is the anxiety noise that may harm the activity or balance of human or animal life. The source of outdoor noise worldwide is mainly caused by Machines and transportation system, motor vehicles engines and trains. In Noise pollution study of Kopergaon city, the analysis of traffic noise, and other sources of noise pollution is analyzed and mapped. From the study, present noise level at selected sites will be compared with the standers of Ministry of Environment and Forest for the further conclusion and remedies. Remedial measures of the nose pollution are defined after studying the noise pollution analysis.

1. GENERAL ASPECT OF NOISE POLLUTION:

Sound that is unwanted or disrupts one's quality of life is called as noise. When there is a lot of noise in the environment beyond certain limit, it is termed as noise pollution. [1, 5] Sound becomes undesirable when it disturbs the normal activities such as working, sleeping, and during conversations. It is an underrated environmental problem because of the fact that it can't be seen, smelt, or tasted. World Health Organization stated that "Noise must be recognized as a major threat to human well-being"

In India, the problem of noise pollution is wide spread. Several studies report that noise level in metropolitan cities exceeds specified standard limits. In Indian scenario, noise pollution is a regular phenomenon, especially in urban areas. Usually known sources of noise pollution are vehicular or traffic related or factory or occupational noise pollution. Such kind of noise pollution is part of day-to-day life, and nobody is really seems to be worried about it. The sources of noise pollution are usually multiply during festivals like Diwali, in which fire crackers are responsible for noise pollution. In public festivals as well as in celebrations of marriages, birthdays, election victories, making noise pollution seems to be normal.

2. EFFECT OF NOISE POLLUTION:

The effects of noise are seldom catastrophic, and are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. Sleep disruption, the masking of speech and television, and the inability to enjoy one's property or leisure time impair the quality of life. In addition, noise can interfere with the teaching and learning process; disrupt the performance of certain tasks, and increase the incidence of anti-social behavior

- According to the medical council of India, there are direct links between noise and health. Also, noise pollution adversely affects the lives of millions of people.
- Noise pollution can damage physiological and psychological health.
- High blood pressure, stress related illness, sleep disruption, hearing loss, and productivity loss are the problems related to noise pollution.
- It can also cause memory loss, severe depression, and panic attacks.

3. PRESENT SCENARIO IN THE KOPARGAON CITY:

Kopergaon city is located at 19.885°N 74.478°E in Ahmednagar District, Maharashtra (India). Various small and semi-large scale industries are located in city. One of the international Pilgrimage site Shirdi is located nearby city. Some of the famous educational institutes located in Kopergaon area. State Highway SH-10 is passing through Kopergaon city which runs from Ahmednagar to Manmad via Shirdi. Kopergaon Railway station is located nearby city. The city knows as hub of education and business. The Study on Noise Pollution is important for the betterment of citizens of Kopergaon City.

Permissible noise levels by CPCB – GOI

The Government of India has been set the permissible limits of noise level as shows in Table 1.

Table1. Permissible Noise levels by CPCB - GOI

Sr. No.	Zone	Noise Level in dB	
		Day Time	Night Time
1	Industrial	75	70
2	Commercial	65	55
3	Residential	55	45
4	Silence	50	40

Sources of noise pollution in Kopargaon City

A. Transportation/ Traffic Noise

Transportation systems are the main source of noise pollution in Kopargaon area. The State Highway SH-10 is passing over the city. The SH-10 is more important for transportation. The traffic of heavy vehicles from other states is continuously running from this highway SH-10. Railway Station is situated nearby city. Passenger and cargo trains are continuously running by this route.

B. Industrial Operations

Industrial noise also adds to the already unfavorable state of noise pollution. Kopargaon City having a area of Industrial estate. The Small scale and semi large industries are running in the Industrial estate. Sanjivani Sahakari Sakhar Karkhana is also located nearby city. This is some major sources of noise in city.

C. Educational Institutes

Some of the reputed educational institutes is located in city .the noise level in pick hours is observed very high nearby areas of these institutes.

D. Pilgrimage Sites

In the city various pilgrimage sites i.e. Temples, Masjeed, Gurudwara, etc. is located in city. Daily thousands of Devotees are gather at these sites. This is also major source of noise.

E. Markets

Vegetable market as well as onion market of kopargaon is also sources of noise.

F. Other sources

Construction of buildings, highways, and roads cause a lot of noise, due to the usage of air compressors, bulldozers, loaders, dump trucks, and pavement breakers, loud speakers, plumbing, boilers, generators, air conditioners, fans, and vacuum cleaners add to the existing noise pollution as per environmental protection bureau Gov. of India.

IV. Measuring instrument

Sound Level Meter SL 4010

Noise measurements were performed using an integrated Average Sound Level Meter SL-4010 which is designed for sound level measurements according to the IEC standard. It support diffuse sound field measurements and also meets standard requirements when the supplied windscreen is mounted.



Fig .1 Sound Level Meter SL 4010

Handling of Instrument

The meter was held 1.3 to 1.5 m above the ground surface and 3.0 to 3.5 m away from reflecting surface, if any. The ranges given on instrument are 30-80 dB, 50-100 dB & 80-130 dB. The range of instrument was varying as the zone of noise changes. Example – In Silent zone like Sai City we kept the instrument on the first range i.e. 30-80 dB

When instrument gives the fluctuating readings, for the holding of perfect reading we can used the knob 'Hold'.

4. RESEARCH METHODOLOGY:

In the present study of Noise pollution analysis of Kopergaon city, we have selected 10 sites in city, with the help of noise level meter we measured the noise level in pick hours and pick days, morning and evening, day and night time. The noise level on various time should be recorded for further remedies and to define zones of noise.

Study Area

We select 10 sites in Kopergaon city. The most populated areas as well as sites of traffic and pilgrimage sites in Kopergaon city are selected to study and analysis of noise pollution.

Table.2 Selected Sites for Noise Analysis.

Site. No.	Name of the Site
1.	Railway Station
2.	Sanjivani Sugar Factory
3.	Sanjivani COE
4.	Industrial Estate
5.	SSGM Collage
6.	Yeola Naka
7.	Sai Corner
8.	Bus Stand
9.	ShivajiStatue
10.	Sudesh Talkies Chowk

5. RESULT AND DISCUSSION:

In primary study the results shows that, excess noise pollution in selected sites. The detailed mapping of each selected site is discussed below. The mapping of noise of each selected site with respect to Morning (M), Afternoon (A), Evening (E) and Night (N) will be considered in mapping, as shows in table 3

Table.3 Noise level at Selected Sites

Site	M (dB)	A (dB)	E (dB)	N (dB)
Railway Station	94	79	75	121
Sanjivani Sugar Factory	87	99	115	122
Sanjivani COE	83	73	93	46
Industrial Estate	74	86	89	112
SSGM Collage	94	87	104	77
Yeola Naka	93	94	117	115
Sai Corner	100	97	107	115
Bus Stand	101	97	110	105
ShivajiStatue	75	90	108	59
Sudesh Talkies Chowk	78	92	110	60

Noise profile of selected sites

The noise level on selected sites has been plotted in graphical manner in Figure 2, such that the highest and lowest noise level can be optimizes easily.

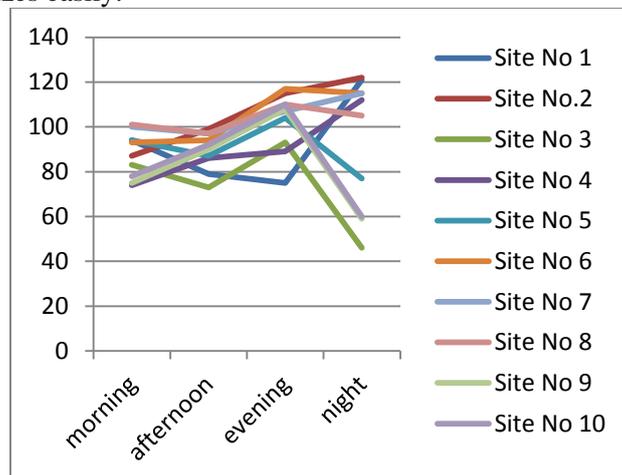


Fig. 2 Noise Profile of Selected Sites

6. CONCLUSION:

From noise level measurement of selected sites it is cleared that the noise level in city is crossing the permissible limits. But by setting of some rules and guidelines noise pollution can be prevented or controlled up to some extent.

Highest noise pollution observed at Sai Baba Corner, Railway Station and Bus Stand. These sites can be protected by various remedies.

Noise level observed in night is high, in some cases the prevention and control is not possible hence for the public safety special provision such as sound proof construction nearby this sites is require.

Zones with noise intensity and detailed noise survey are requiring for future development plan of city.

Proper rules and guidelines are required with respect to noise pollution; it has been observed that the citizens are not following the rules and guidelines with respect to noise pollution, they are using high pressure horns, illegal sound systems for rallies. The rules and guidelines must follow by citizens for their betterment.

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Mining Social Media Data for Understanding Learning Experiences of Engineering Students

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Abstract: Students’ informal conversations on social media shed light into their educational experiences. Data from such uninstrumented environments can provide valuable knowledge to inform student learning.

Analyzing such data, however, can be challenging. The complexity of students’ experiences reflected from social media content requires human interpretation. However, the growing scale of data demands automatic data analysis techniques. In this work, we have to develop a workflow to integrate both qualitative analysis and large-scale data mining techniques. We focus on engineering students’ Twitter posts to understand issues and problems in their educational experiences.

This work proposes deep insights into engineering students’ educational experiences as reflected in informal, uncontrolled environments. Many issues and problems such as study life balance, lack of sleep, lack of social engagement, and lack of diversity clearly emerge. These could bring awareness to educational pedagogy, policy-making, and educational practice.

Keywords: Social Media, Mining, Multilabel Classification, Data Analysis, Data Preprocessing

1. INTRODUCTION:

Social media sites such as Twitter, Facebook and You-Tube provide major platform for students to share their experiences, express emotion and stress, and seek social support. On various social media sites, students discuss and share their everyday encounters in an informal and casual manner. Students’ digital footprints provide vast amount of implicit knowledge and a whole new perspective for educational researchers and practitioners to understand students’ experiences outside the controlled classroom environment. This understanding can inform institutional decision-making on interventions for at-risk students, improvement of education quality, and thus enhance student recruitment, retention, and success [2]. Traditionally, educational researchers have been using methods such as surveys, interviews, focus groups, and classroom activities to collect data related to students’ learning experiences [4]. These methods are usually very time-consuming, thus cannot be duplicated or repeated with high frequency. The emerging fields of learning analytics and educational data mining (EDM) have focused on analyzing structured data obtained from course management systems (CMS), classroom technology usage, or controlled online learning environments to inform educational decision-making [5], [6]. However, to the best of our knowledge, there is no research found to directly mine and analyze student posted content from uncontrolled spaces on the social web with the clear goal of understanding students’ learning experiences.

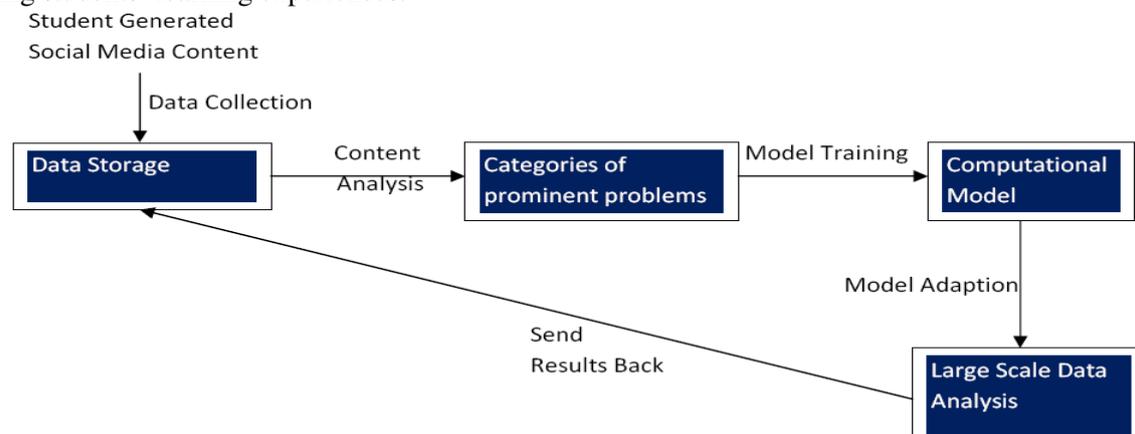


Fig.1 System architecture

In this work, we have to go through an exploratory process to locate the relevant data and Twitter hashtags. We have to collect certain number of tweets using the hashtag #engineeringProblems over a specific period. This dataset can be used to train and test the system. We have to conduct an inductive content analysis on samples of the #engineeringProblems data set. We found that major problems engineering students encounter in their learning experiences fall into several prominent categories. Based on these categories, we can implement a multilabel Naive Bayes classification algorithm. We can use the classification algorithm to train a detector that could assist in the detection of engineering students' problems.

2. LITERATURE SURVEY:

Mining Twitter Data

Popular classification algorithms include Naive Bayes, Decision Tree, Logistic Regression, Maximum Entropy, Boosting, and Support Vector Machine (SVM). Based on the number of classes involved in the classification algorithms, there are binary classification and multi-class classification approaches. In binary classification, there are only two classes, while multi-class classification involves more than two classes. Both binary classification and multi-class classification are single-label classification systems. Single-label classification means each data point can only fall into one class where all classes are mutually exclusive. Multi-label classification, however, allows each data point to fall into several classes at the same time.

Most existing studies on tweet classification are either binary classification on relevant and irrelevant content [9], or multi-class classification on generic classes such as news, events, opinions, deals, and private messages [10]. Sentiment analysis is another very popular three-class classification on positive, negative, or neutral emotions/opinions[11]. Sentiment analysis is very useful for mining customer opinions on products or companies through their reviews or online posts. It finds wide adoption in marketing and customer relationship management (CRM). Many methods have been developed to mine sentiment from texts. For example, both Davidov et al. [7] and Bhayani et al. [8] use emoticons as indicators to provide noisy labels to the tweets thus minimizing human effort needed for labeling. However, in the case of this work, only knowing the sentiment of student-posted tweets does not provide much actionable knowledge on relevant interventions and services for students.

3. LEARNING ANALYTICS AND EDUCATIONAL DATA MINING:

Learning analytics and educational data mining are data driven approaches emerging in education. These approaches analyze data generated in educational settings to understand students and their learning environments in order to inform institutional decision-making. The present work extends the scope of these approaches in the following two aspects. First, data analyzed using these approaches typically are structured data including administrative data (e.g., high school GPA and SAT scores), and student activity and performance data from course management systems (CMS) or virtual learning environments (VLE) such as Blackboard (<http://www.blackboard.com/>). Our study extends the data scope of these data-driven approaches to include informal social media data. Second, most studies in learning analytics and EDM focus on students' academic performance. We extend the understanding of students' experiences to the social and emotional aspects based on their informal online conversations.

Swati Patil and Saroja Kulkarni [13], Asst. Professor VIIT, Kondhwa Pune, India, have worked on Mining Social Media Data for Understanding Students' Learning Experiences using Memetic algorithm. Also Ms. Priyanka Patel and Ms. Khushali Mistry [12], Department of CSE, PIET, Vadodara, India, both have worked on Classification of Student's E-Learning Experiences' in Social Media via Text Mining.

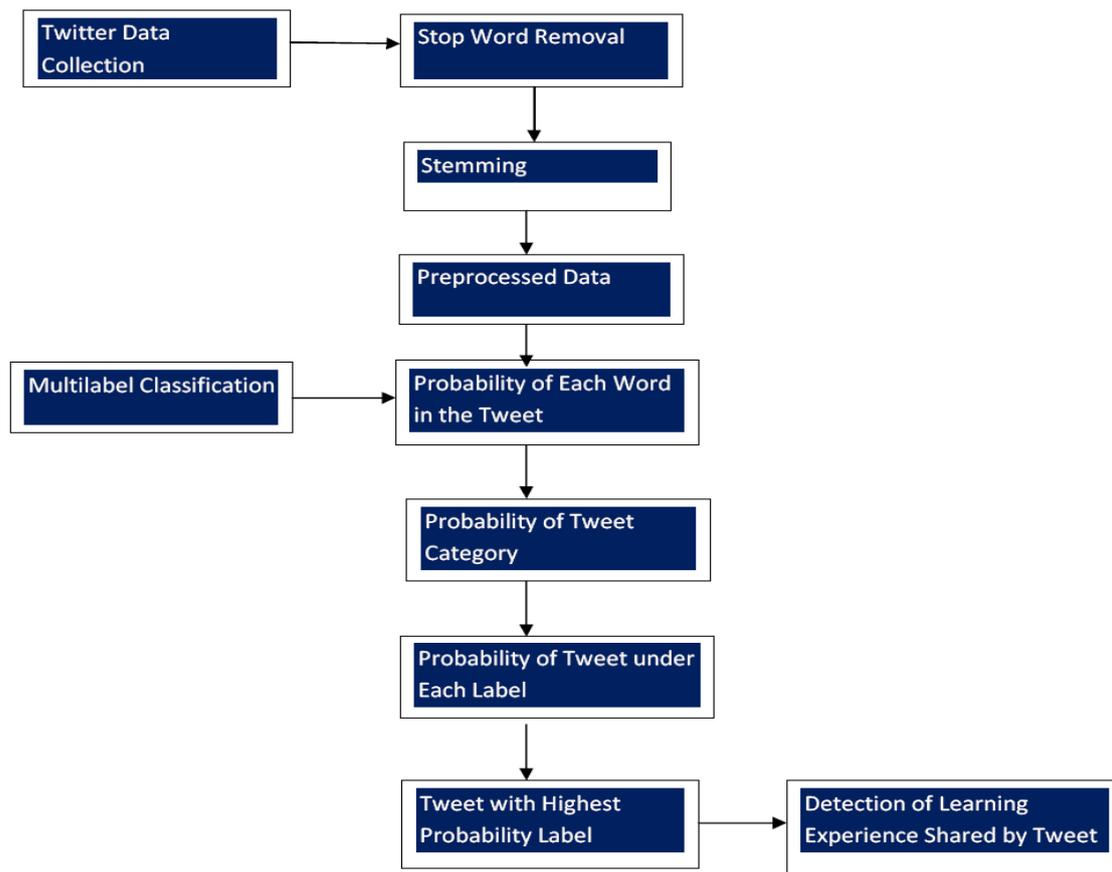


Fig. 2 Work Flow of Proposed System

4. PROPOSED SYSTEM:

Data Collection module:

We have to search data using an educational account on a commercial social media. Using Twitter API [12] we can collect different tweets on user's wall. We start by searching based on different Boolean combinations of possible keywords such as engineer, students, campus, class, homework, professor, and lab. We then expand and refine the keyword set and the combining Boolean logic. Usually students post their tweets using a Hash tag. Students use the hashtag #engineeringProblems to post about their experiences.

Inductive content analysis:

First conduct an inductive content analysis on the #engineeringProblems data set. Inductive content analysis is one popular qualitative research method for manually analyzing text content. This leads to development of five prominent problems that engineering students encounter in their learning experiences such as heavy study load, lack of social engagement, negative emotion, sleep problems, and diversity issues.

Text Preprocessing:

Remove all the #engineeringProblems hashtags. Substitute words ending with "n't" and other common negative words (e.g., nothing, never, none, cannot) with "negtoken". Remove all words that contain non-letter symbols and punctuation. Like @ and http links. When we detect two identical letters repeating, we keep both of them. If we detect more than two identical letters repeating, we replace them with one letter. Therefore, "huuungryyy" and "sooo" were corrected to "hungry" and "so". Lemur information retrieval toolkit is used to remove the common stopwords. We keep words like "much, more, all, always, still, only", because the tweets frequently use these words to express extent.

Training module: In training phase we train our system. In these we use Multi Label Classification. The data set is converted into a frequency table. Create Likelihood table by finding the probabilities. Use Naive Bayesian equation to calculate the posterior probability for each class. The class with the highest posterior probability is the outcome of prediction. If some new words which are related to the five classes are found then they are added in the keyword data set.

5. CONCLUSION:

Proposed system collects certain number of tweets using the hashtag #engineeringProblems over a specific period. This dataset can be used to train and test the system. We have to conduct an inductive content analysis on samples of the #engineeringProblems data set. We found that major problems engineering students encounter in their

learning experiences fall into several prominent categories. Based on these categories, we can implement a multilabel Naive Bayes classification algorithm. We can use the classification algorithm to train a detector that could assist in the detection of engineering students' problems.

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Blockchain: Overview and Applications

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Abstract: Blockchain advancement was at first introduced as the development behind the Bitcoin decentralized virtual cash, yet there is the want that its characteristics of exact and irreversible data move in a decentralized P2P framework could make distinctive applications possible. Blockchain an obviously unassuming information structure, and a suite of related traditions, have starting late taken the universes of Finance and Technology by storm through its momentous application in the present day digital money Bitcoin, and more so because of the problematic advancements it ensures. Blockchain structures and applications can be utilized to agree to societal requirements and open esteems.

Keywords – Blockchain(BC),Blockchain Technology(BCT), Bitcoin, Security, Public Ledger

1. INTRODUCTION:

In the time since 2009 the digital currency framework has developed in estimation of more than \$60 billion in mid 2017 and is currently the most surely understood BC application, however more essentially it prompted the ascent of a biological system of creative thoughts and administrations that extends a long ways past the monetary area.

Bitcoin was the main framework to incorporate the blockchain(BC) information storage structure and has filled in as the reason for all blockchain usage to follow in areas as energy sector, supply chains and logistics, the music industry, and the social insurance part. It likewise goes under the name Distributed Ledger Technology (DLT). DLT depends on the possibility that every member approaches a mutual record. Having an open, generally available record was conceived with Bitcoin, and the framework gave the main answer for the issue of establishing trust in an insecure environment without relying on a third-party [1].

The essential thought behind the BCT is that it permits performers in a framework (called nodes) to execute computerized resources utilizing a P2P network that stores these exchanges distributedly over the system. The owners of the benefits, and the exchanges including change of ownership, are enlisted on the ledger by public key cryptography and digital signatures. Each transaction is approved by the nodes in the system by utilizing some sort of an 'consensus mechanism' (a consensus protocol). This works as follows. Whenever a transaction is entered into the P2P network, the nodes first validate the transaction. If the nodes agree on its legitimacy, they confirm the transaction and this decision is laid down in a block. This new block is added to the past chain of blocks and as such locked. Along these lines, the most recent block keeps up a shared, agreed-upon view of the current state of the BC. nges are stored in a ledger which every single included node hold a copy of. Blocks are time stamped clusters of legitimate transaction. For security reasons each block incorporates the hash of the earlier piece. The hash is utilized to distinguish the data and to guarantee the trustworthiness of the information.

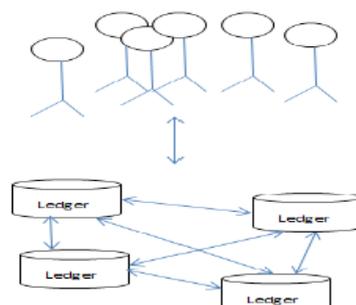


Fig. 1 Distributed Ledgers for information sharing

The connected blocks shape a chain, henceforth the name 'blockchain'. Creating new blocks is known as mining. It isn't the hash pointers connecting the blocks into a chain that gives a BC its security, it just makes alterations of transactions in the BC simple to find [1].

A ledger contains the shared and agreed-upon state of the BC and the list of transactions that were processed by the nodes. Each node in this decentralized framework has a copy of the BC which is ceaselessly synchronized with other copies. Along these lines there is no centralized point of vulnerability that computer hackers can exploit. Bringing one node down won't prompt a breakdown of the chain of blocks. This typical P2P architecture adds to the security and also the immutability of the transactions that are recorded in the BC. Furthermore, the distributed consensus protocol (which can have a several structures, for example, majority voting, priority voting or having an minimum number of votes) guarantees the information integrity of the transactions.

The principle theory is that the blockchain sets up an arrangement of making a distributed record in the digital online world. This permits partaking entities to know for sure that a computerized occasion occurred by making an evident record in an public ledger. It opens the passage for working up a vote based open and versatile computerized economy from an incorporated one. There are colossal open doors in this problematic innovation and upset in this space has quite recently started digital online world. [13].

Current advanced economy depends on the dependence on a trusted party. Our everything on the web exchanges depend on putting stock in somebody to reveal to us reality—it can be a bank telling your amount is sent to the receiver; it can be a social media like WhatsApp telling your message is delivered; or it can be certification authority telling certain digital certificate is genuine. The truth of the matter is that we carry on with our life problematically in the advanced world by depending on a third party for the security and protection of our computerized resources. The reality remains that these outsider sources can be hacked, controlled or traded off [7].

This is the place the blockchain innovation comes helpful. It can possibly reform the computerized world by empowering a distributed judgment where every last online exchange, previous and current, including computerized resources can be checked whenever later on. It does this without trading off the security of the advanced resources and parties included. The conveyed accord and namelessness are two essential qualities of blockchain innovation.

2. LITERATURE SURVEY:

Government Information Quarterly in 'Blockchain in government: Benefits and implications of distributed ledger technology for information sharing' addresses that whether blockchain technology will lead to innovation and transformation of governmental processes. To address this question they present a critical assessment of the often exaggerated benefits of blockchain technology and discuss their implications for governmental organizations and processes [1].

Nir Kshetri evaluates blockchain's roles in strengthening cybersecurity and protecting privacy. From the security and privacy considerations, it highlights how blockchain-based solutions could possibly be, in many aspects, superior to the current IoT ecosystem, which mainly relies on centralized cloud servers through service providers [2].

Michael Coblenz proposes a new domain specific programming language, Obsidian, to make it easier for programmers to write correct blockchain programs and avoids bugs from Solidity programming language [3].

Arthur Gervais et al. introduce a novel quantitative framework to analyse the security and performance implications of various consensus and network parameters of Proof of Work blockchains [4].

Alex Pazaitis, Primavera De Filippi, Vasilis Kostakis explores the potential of blockchain technology in enabling a new system of value that will better support the dynamics of social sharing [5].

Janusz J. Sikorski a, Joy Haughton a, Markus Kraft presents an example where blockchain is employed to facilitate machine-to-machine (M2M) interactions and establish a M2M electricity market in the context of the chemical industry [6].

Ganesh B. Gadekar and Chaitanya P. Chandgude discusses the caliber of blockchain technology and it's scope in majority of the fields like medical, banks, voting where security, trust, confidentiality are on stake [7].

Nonhlanhla Ntuli, Adnan Abu-Mahfouz proposes a simple secure architecture for smart water management system using a blockchain innovation[8].

Seyoung Huh, Sangrae Cho, Soohyung Kim presents a way of managing IoT devices using blockchain platform. They have used Ethereum as their blockchain platform and they manage keys using RSA public key cryptosystem [9].

Hitoshi Okada, Shigeichiro Yamasaki, Vanessa Bracamonte proposes a classification based on twodimensions external to the system: (1) existence of an authority (without an authority and under an authority) and (2) incentive to participate in the blockchain (market-based and non-market-based) [10].

David Ferbrache tells that passwords have become one of the weakest links in our security chain, compounded by our inability to memorise the long and complex passcodes demanded by our security systems and proposes a way to tackle with it using blockchain [11].

Xiaoqi Li et al. studied the security threats to blockchain and survey the corresponding real attacks by examining popular blockchain systems and also review the security enhancement solutions for blockchain, which could be used in the development of various blockchain systems [15].

3. OVERVIEW OF BLOCKCHAIN TECHNOLOGY:

Being a decentralized framework, blockchain frameworks do not require a third-party trusted specialist. Instead, to ensure the reliability and consistency of the information and exchanges, blockchain receives the decentralized consensus mechanism. Proof of Work (PoW) is one. PoW mechanism solution of puzzles to demonstrate the validity of the information. The puzzle is ordinarily a computationally difficult but effortlessly verifiable problem. When a node creates a block, it must resolve a PoW puzzle [15]. After the PoW puzzle is settled, it will be broadcasted to other nodes, so as to accomplish the purpose of consensus, as shown in Fig. 2

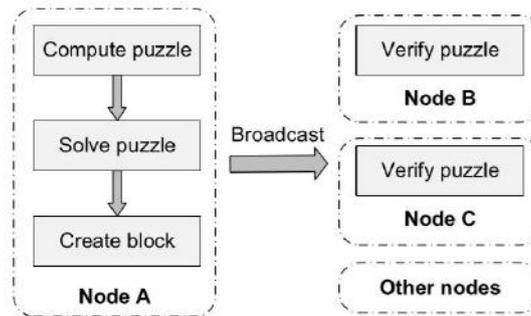


Fig. 2 PoW consensus mechanism Block propagation and synchronization

In the blockchain, each full node stores the data of all blocks. Being the foundation to building agreement and trust for blockchain, the block propagation mechanism can be separated into the following categories

(1) Advertisement-based propagation. This mechanism is started from Bitcoin. When node A gets the information of a block, A will send an inv message (a message type in Bitcoin) to its associated peers. When node B gets the inv message from A, it will do as follows. In case node B as of now has the information of this block, it will do nothing. In the event that node B does not have the data, it will reply to node A. When node A gets the reply message from node B, node A will send the complete information of this block to node B.

(2) Sendheaders propagation. This propagation mechanism is an improvement to the advertisement-based propagation mechanism. In the sendheaders propagation mechanism, node B will send a sendheaders message (a message type in Bitcoin) to node A. When node A receives the information of a block, it will send the block header information directly to node B. Compared with the advertisement-based propagation mechanism, node A does not need to send inv messages, and hence it speeds up the block propagation.

(3) Unsolicited push propagation. In the unsolicited push mechanism, after one block is mined, the miner will directly broadcast the block to other nodes. In this propagation mechanism, there is no inv message and sendheaders message. Compared with the previous two propagation mechanisms, unsolicited push mechanism can further improve the speed of block propagation.

(4) Relay network propagation. This propagation mechanism is an improvement to the unsolicited push mechanism. In this mechanism, all the miners share a transaction pool. Each transaction is replaced by a global ID, which will greatly reduce the broadcasted block size, thereby further reducing the network load and improving the propagation speed [15].

4. TECHNOLOGICAL DEVELOPMENT:

From the birth of the first blockchain system Bitcoin, the blockchain technology has experienced two stages of development: blockchain 1.0 and blockchain 2.0. In the blockchain 1.0 stage, the blockchain technology is mainly used for cryptocurrency. In addition to Bitcoin, there are many other types of cryptocurrencies [15].

There are currently over 700 types of cryptocurrencies, and the total market capitalizations of them are over 26 billion US\$ [1].

Compared with traditional currency, cryptocurrency has the following characteristics and advantages:

(1) Irreversible and traceable. Transfer and payment operations are irreversible using cryptocurrency. Once the behavior is completed, it is impossible to withdraw. In addition, all user behaviors are traceable, and these behaviors are permanently saved in the blockchain.

(2) Decentralized and anonymous. There is no third-party organization involved in the entire structure of cryptocurrency, nor does it have central management like banks. In addition, all user behaviors are anonymous. Hence, according to the transaction information, we cannot obtain the user's real identity.

(3) Secure and permissionless. The security of the cryptocurrency is ensured by the public key cryptography and the blockchain consensus mechanism, which are hard to be broken by the criminal. Moreover, there is no need to apply for any authority or permission to use cryptocurrency. Users can simply use the cryptocurrency through the relevant clients.

(4) Fast and global. Transactions can be completed in only several minutes using cryptocurrency. Since cryptocurrencies are mostly based on public chains, anyone in the world can use them. Therefore, the user's geographical location has little impact on the transaction speed.

In blockchain 2.0 stage, smart contract is introduced so that developers can create various applications through smart contracts. A smart contract can be considered as a lightweight dAPP (decentralized application). Ethereum is a typical system of blockchain

2.0. Each Ethereum node runs an EVM (Ethereum Virtual Machine) that executes smart contracts. Besides Ethereum, several other blockchain systems like RSK, Counterparty, Stellar, Monax, Lisk also support smart contracts [15].

5. APPLICATIONS:

Blockchain is not all related to bitcoin, one can treat blockchain as a platform and develop an application based on this adept innovation. Few are discussed below.

The applications of blockchain are for the crypto currencies like bitcoin where public ledger is maintained and having no central authority to control. Secure against malicious attacks.

Current cloud storage administrations are concentrated — hence clients must place confide in a solitary storage supplier. Storage provider controls the majority of user's online resources. Then again with the Blockchain, this can wind up plainly decentralized. Anybody on the web can store your information at a pre-concurred cost. Hashing and having the data in different places are the keys to securing it.

Blockchain advances make tracking and managing computerized identity both secure and proficient, bringing about consistent sign-on and lessened misrepresentation. Be it managing an account, human services, national security, citizenship documentation or web based retailing, character verification and approval is a procedure complicatedly woven into trade and culture around the world.

Smart contracts are lawfully restricting programmable digitized contracts entered on the blockchain. What engineers do is to actualize lawful contracts as factors and explanations that can release of funds utilizing the blockchain arrange as an 'outsider agent', instead of confiding in a solitary central authority.

Utilizing the blockchain, a voter could watch that her or his vote was effectively transmitted while staying mysterious to rest of the world.

Industry can also opt for blockchain technology for security, decision making or asset management, here they can go with the privately shared ledger, where only selected people will have access to share database or ledger.

A person can also store his or her secure data on blockchain. It will be in hashed format so no need to worry.

Blockchain also has its application in the medical field where all medical records and files of person or patient will be on blockchain where if he met with an accident then just with the help of his identity all his previous records can be seen and right treatment will be given or diagnosis can be done[2]. Security architecture for smart water management systems to ensure secure booting, secure communications and secure firmware updates can also be developed by taking the advantage of blockchain technology [8].

IoT devices can also be managed using Ethereum, blockchain computing platform. Ethereum with approximately 12 second block period lets developers write smart contract [9][2]. The blockchain technology can be used to facilitate M2M interactions and establish a M2M electricity market in the context of the chemical industry via the IoT [6]. It can also be used in banking and finance for cost savings, efficiency and transparency [11]. Blockchain can also be used for authentication with biometrics as passwords are not foolproof [14].

6. CONCLUSION:

BC is an innovative, general purpose technology, offering new ways of organization in many domains for recording transactions, events, certificates and ownership.

Though blockchain came into existence for bitcoin. Because of the its caliber, it have huge scope in majority of the fields like medical, banks, chemical engineering, voting etc where security, trust, confidentiality are on stake. Industry, individual or group of individuals can use it where security is important and as blockchain do not have central control. It has distributed database and is secure against the malicious attacks.

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A REVIEW ON VEDIC MULTIPLIER IN VLSI

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Abstract: A multiplier is one of the key hardware block in most of applications such as digital signal processing, encryption and decryption in cryptography and in other computations. With advances in technology, many researchers have tried to design multipliers which offer either of high speed, low power consumption, regularity of layout and hence less area or even combination of them. Speed can be enhanced by array multiplier, modified booth algorithm, Wallace tree multiplication and by using vedic multiplier. Vedic multiplier is based on Vedic formulae which are derived from Vedas. Vedic mathematics currently under focus as it gives improvement in speed as well as less power consumption. Vedic mathematics consists of 16 sutras, out of these sutras UrdhvaTiryakbyam(UT) is found to be most efficient in all types of multiplications. A huge number of multipliers are proposed based on UrdhvaTiryakbyam. The NikhilamNavatashcaramamDashatah(NND) sutra is efficient in case of only large number (near to base such as 100, 1000 etc.) multiplications. This paper presents a review on multiplier circuit implemented with different modification mainly by using vedic mathematics for reducing delay, power and area.

1. INTRODUCTION:

In processors or microcontrollers the arithmetic and logical unit(ALU) performs the computations, if multiplication is to be performed by ALU then it require series of additions. Such technique is time consuming for the applications such as image processing, speech processing, cryptography which involves large number of multiplications. These multiplications required for applying digital signal processing techniques such as convolution, FFT etc. To get the faster result with low power for these DSP operations many multiplying circuits are developed. Wallace [1] arranged the partial passes simultaneously to achieve faster speed of array multiplier. 2 bit gated adder circuit with 2 bit anticipated carry used by Stylianos [2] to implement 40 ns array multiplier. The critical path often traverses from the carry-in to the carry-out of the full adders. It is demanded that the generation of the carry-out signal is fast. Otherwise, the slower carry-out generation will not only extend the worst case delay, but also create more glitches in the later stages, hence, dissipate more power. The tree structured applications, which is frequently used in Wallace-Dadda tree multipliers are addressed by Song [3]. The full adder circuit analysis is given by Massimo and Gaetano [4] which is helpful while implementing the adder in a multiplier block. The technique for low power such as using low voltage supply, improving logic style, circuit and technology optimization is given by Chandrakasan et al. [5]. Wang et al. [6] have used the technique of column compression to increase the regularity and reduce interconnection length of multiplier layout. The pass transistor multiplexer by Norio Ohkubo et al. [7] reduced the execution time of 54x54 bit multiplication by 14%. To improve the performance of multiplier in terms of power, delay and area Kuang [8] has developed dynamic range detectors whereas Chen, et al. [9] have used weighted representation. Signal flow optimization in adder array for partial product reduction, left-to-right leapfrog (LRLF) signal flow and splitting of the reduction array into upper/lower parts is presented by Huang [10]. Use of moduli in residue number system to reduce the partial products which in turn improves the speed of multiplier is presented by Efstathiou, et al. [11]. Ho and Kim [12] have used combining multiplication with accumulation and devising a hybrid type of carry save adder to improve the performance of multiplier. Therefore it is pointed out that all these multiplier are basic booth or array multiplier with modifications for performance improvement. But, if Vedic multiplier is used for multiplication, it will further improve the performance of multiplier in terms of delay as Vedic mathematics is known for fast multiplication.

The paper is organized in five sections. Section I deals with the introduction to basic multiplier circuits. What is Vedic mathematics and its application for improving performance of multiplier, which are implemented on CMOS logic are given in section II. A literature on Vedic multiplier in VLSI is reviewed in section III. This section focused on multiplier implemented on reconfigurable hardware with hardware description language (HDL). Use of Vedic

multiplier in applications such as multiplication of decimal number, complex number, floating point number, finding square and cube, and digital signal processing (DSP) application such as convolution and Fast Fourier transform (FFT) are given in section IV. Finally concluding remarks with future direction for research is discussed in section V.

2. VEDIC MATHEMATICS:

In Sanskrit word 'Veda' stands for 'knowledge'. Vedic mathematics is believed to be reconstructed from vedas by Sri Bharti Krishna Tirathaji between the years 1911 to 1918 [13]. The vedic mathematics has been divided into sixteen different Sutras which can be applied to any branch of mathematics like algebra, trigonometry, geometry etc. Its methods reduce the complex calculations into simpler ones because they are based on methods similar to working of human mind thereby making them easier. The sutras are given with their English translation in Table 1.

Sr. No.	Name of Vedic sutra	Translation in English
1	Shunyamanyat (Anurupye)	If one is in ratio, the other is zero
2	Chalana-Kalanabyham	Differences and Similarities
3	EkadhikinaPurvena	By one more than the previous one
4	EkanyunenaPurvena	By one less than the previous one
5	Gunakasamuchyah	The factors of the sum is equal to the sum of the factors
6	Gunitasamuchyah	The product of the sum is equal to the sum of the product
7	NikhilamNavatashcaramamDashatah	All from 9 and the last from 10
8	ParaavartyaYojayet	Transpose and adjust
9	Puranapurabyham	By the completion or noncompletion
10	Sankalana-vyavakalanabhyam	By addition and by subtraction
11	ShesanyankenaCharamena	The remainders by the last digit
12	ShunyamSaamyasamuccaye	When the sum is the same that sum is zero
13	Sopaantyadvayamantyam	The ultimate and twice the penultimate
14	Urdhva-tiryakbyham	Vertically and crosswise
15	Vyashtisamanstih	Part and Whole
16	Yaavadunam	Whatever the extent of its deficiency

Table 1: Vedic Sutras with their meaning

Out of all these 16 sutras most of researchers used Urdhva-tiryakbyham and very few had used NikhilamNavatashcaramamDashatah, (Anurupye) Shunyamanyat for implementation of multiplier. The multiplier is based on an algorithm UrdhvaTiryakbhyam (Vertical and Crosswise) of ancient Indian Vedic Mathematics. UrdhvaTiryakbhyam Sutra is a general multiplication formula applicable to all cases of multiplication. It literally means vertical and crosswise. It is based on a novel concept through which the generation of all partial products can be done with the concurrent addition of these partial products. The algorithm can be generalized for $N \times N$ bit number. Using this method of multiplication following researchers improved the basic multiplier. These multipliers are implemented at transistor level using Complementary Metal Oxide Semiconductor (CMOS) logic. PrabirSaha et al. [14] designed a high speed complex multiplier using Vedic mathematics. The partial products and sums are generated in one step which reduces the carry propagation from LSB to MSB. The implementation of the Vedic mathematics and their application to the complex multiplier ensure substantial reduction of propagation delay in comparison with Distributed Arithmetic based architecture and parallel adder based implementation which are most commonly used architectures. The functionality of these circuits was checked and performance parameters like propagation delay and dynamic power consumption were calculated by spice spectre using standard 90nm CMOS technology. The propagation delay of the resulting $(16,16) \times (16,16)$ complex multiplier is 4ns and consume 6.5 mW power. This design has achieved almost 25% improvement in speed.

D. Kayal et al. [15] designed 8 bit Vedic Urdhva-Tiryakbhyam multiplier using Multiple channel CMOS (McCMOS) and simulated in Cadence-Spice simulator with 1 V power supply. The implementation shows that average power increases a bit but the propagation delay of the circuit reduces in a large proportion to cause a considerable amount of reduction in Power Delay Product (PDP). The PDP reduces upto 80 % in Urdhva-Tiryakbhyam multiplier compared to conventional multiplier algorithm. Moreover, the use of 130 nm, 90 nm, 65 nm, 45 nm MOS structures makes the circuit more power efficient and provides high performance in ultra low power applications. The McCMOSUrdhva-Tiryakbhyam multiplier gives about 73%–90% less amount of delay compared to the McCMOS conventional multiplier and the overall PDP is reduced considerably.

Deodhe et al. [16] designed schematic of 8-bit Vedic multiplier using Tanner Tool. The design is then verified in T-SPICE using 180 nm CMOS technology model library file. The analysis is made for voltage ranges of 2.5V to 5V.

The results prove that the proposed multiplier consumes 75% less power. The core area of the proposed multiplier is $720 \mu\text{m}^2$

Singh and Sasamal [17] designed Vedic multiplier using Adiabatic Logic in this comparative study of CMOS, Efficient Charge Recovery Logic (ECRL) and Positive Feedback Adiabatic Logic (PFAL) based on 2×2 binary Vedic multiplier designs is given. The results are verified using different values of load capacitors and different frequency of operations. Comparison result shows that the Vedic multiplier designed using the PFAL technique consumes less power as compared to ECRL and CMOS designs. PFAL based Vedic multiplier proves to be economic in terms of power consumption also at higher frequencies. ECRL based Vedic multiplier is power efficient at low frequency, as frequency increases its power saving efficiency decreases. PFAL incurs 64% lesser power consumption than its CMOS design counterpart. This validates that the Vedic multiplier using PFAL is more power efficient than the conventional CMOS and ECRL design structures.

Low power Vedic multiplier using energy recovery logic by Sangani et al.[18] presents high performance and energy efficient implementation of the binary multiplier. The design is based on Vedic multiplication and the low power energy recovery (adiabatic logic). Here Vedic approach and the energy recovery capability of the adiabatic logic together realize high speed and low power operation of the design. A 8×8 Vedic multiplier and conventional array multiplier based on the Differential Cascode Pre-resolve Adiabatic Logic (DCPAL) operating at 25 MHz frequency is simulated at 45nm technology node by using Spice spectre tool. Simulation results validate this design incurring 87.21 percent lesser power than the standard CMOS equivalent design

ASIC design of a high speed low power circuit for factorial calculation of a number is reported by Saha et al. [19]. The factorial of a number can be calculated using iterative multiplication by incrementing or decrementing process and iterative multiplication can be computed through parallel implementation methodology. Parallel implementation along with Vedic multiplication methodology for calculation of factorial of a number ensures significant reduction in propagation delay and switching power consumption due to reduction of stages in multiplication process, in comparison with the conventionally used Vedic multiplication methodologies like 'Urdhva-tiryakbyham'(UT) and 'NikhilamNavatas-caramamDasatah'(NND) based implementation methodology. Transistor level implementation was carried out using spice spectre with standard 90nm CMOS technology and the results were compared with conventional methodologies. The propagation delay for the calculation of 4-bit factorial of a number was only 42.13ns while the power consumption of the same was 58.82mW for a layout area of 6 mm^2 . Improvement in speed was found to be 33% and 24% while corresponding reduction of power consumption in 34.48% and 24% for the factorial calculation circuitry in comparison with UT and NND based implementations.

3. VEDIC MULTIPLIER IMPLEMENTATION ON RECONFIGURABLE HARDWARE:

The vedic multiplier performance can be verified by implementing it on reconfigurable hardware with the help of hardware description language (HDL). The EDA tools such as Xilinx and Altera Quartus II are powerful tools which gives analysis of the design for different parameters such as area (in terms of number of slice or LUT), delay and power dissipation. Most of researchers had implemented the multiplier on FPGA with VHDL or Verilog. Some of these are described below.

The technique for implementation of general $N \times N$ multiplication is proposed by Akther [20]. A general method applicable for 4,8,16 and 32 bit multiplication is given. This method requires less computation time for calculating the multiplication result for $N \times N$ bit. New multiplier and square architecture is proposed by Tiwari et al. [21] based on Urdhvatiryakbhyam of Vedic Mathematics. It is based on generating all partial products and their sums in one step. The design implemented on FPGA shows that the Vedic multiplier and square are faster than array multiplier and Booth multiplier. Also Vedic multiplication formulae, Urdhvatiryakbhyam and Nikhilam, have been investigated. UrdhvaTiryakbhyam, being general mathematical formula, is equally applicable to all cases of multiplication and Nikhilam Sutra used for multiplication of two large numbers. 16×16 bit. Pohokar et al. [22] designed vedic multiplier based on Urdhva-Tiryagbhyam Sutra. This Vedic multiplier is coded in VHDL, synthesized and simulated by using Xilinx ISE 10.1. The results shows that as the number of bit increases from 8×8 bit to 16×16 bit, the timing delay greatly reduces for vedic multiplier as compared to array multiplier. The time delay in vedic multiplier for 16×16 bit number is 28.779 ns while the time delay for Array multiplier is 61.241 ns. Jagannatha et al. [23] have implemented UrdhvaTiryakbhyamvedic multiplier using FPGA and ASIC. For implementation they used standard cell-based ASIC design, with which vedic multiplier is realized in 180 nm CMOS technology, This resulted in speed of 5.2 ns, power 257 μW , and it is using area of 1117 cells. Bansal and Madhu [24] have designed a vedic multiplier which is using compressed adder for further improvement in speed of multiplier. In this mainly different compressed adders such as 5-3,10-4,15-4, 20-5 are designed and compared the delay with conventional adder. The compressed adders are faster than conventional adders. These compressed adders are used in vedic multiplier for getting the faster result. Rawat et al. [25] in paper titled Design and Analysis of ALU: Vedic Mathematics Approach presents multiplication Urdhva-Tiryakbhyam Sutra of Vedic mathematics, and proved the computational benefits given by vedic methods. FPGA Implementation of high speed 8-bit Vedic multiplier using barrel shifter by Pavan

Kumar et al. [26] describes the implementation of an 8-bit vedic multiplier using barrel shifter which requires only one clock cycle for 'n' number of shifts, implemented and verified using FPGA and ISE Simulator, achieved an improvement in the reduction of delay with 45% when compared to array multiplier, booth multiplier and conventional vedic multiplier implementation on FPGA

4. APPLICATIONS OF VEDIC MULTIPLIER:

In this section applications of vedic multiplier are given. The vedic multiplier used for multiplying decimal numbers, complex numbers, floating point numbers, finding square and cube, also DSP applications such as performing convolution, FFT and wavelet transform are given as follows.

A) Multiplication of Decimal numbers

Saha et al. [27] designed vedic multiplier for decimal number system based on "Nikhilam Navatascaramam Dasatah (NND)" (all from 9 and last from 10) from vedas. For implementation of decimal number multiplier radix selection unit, logical shifter and adder/subtractor block is used and these circuits are implemented using Transmission Gate (TG). The functionality of these circuits was checked and performance parameters such as propagation delay, dynamic switching power consumptions were calculated by spice spectre using 90nm CMOS technology. BCD implementation of Vedic multiplier ensures the stage reduction for decimal number, hence substantial reduction in propagation delay. (5×5) digit decimal multiplier results in propagation delay of only ~5.798ns, this is about 26% improvement in speed.

B) Multiplication of Complex numbers

Thakare et al. [28] designed complex number multiplier using Vedic mathematics and implemented using VHDL with Xilinx ISE. The implementation of the Vedic sutras and their application to the complex multiplier ensure substantial reduction of propagation delay

C) Multiplication of Floating point numbers

Anjana et al.[29] proposed floating point multiplier based on vedic mathematics, this is designed with different adder structures viz. Ripple Carry Adder (RCA) and Carry Look-ahead Adder (CLA). The multipliers are structurally modeled in Verilog HDL. The design entry was done using Xilinx ISE 14.2 and was implemented on Virtex-5. The area of these multipliers was slightly high, but the speed of these multipliers was 43.64% higher as compared to array Multiplier.

Mangalath et al. [30] designed a floating point Vedic multiplier which performs three precision (single precision, double precision and quadruple precision) multiplication operation. The universal floating point multiplier is implemented using NikhilamNavatascaramamDasatah Sutra of Vedic mathematics. Complex Floating Point Multiplier within range of single precision format implemented by Thakare et al. [31] for FFT application. Mahakalkar et al. [63] designed IEEE 754 floating point multiplier for single and double precision, multiplier synthesized and verified using VHDL on Xilinx Virtex - 5 FPGA. The Urdhva-Tiryakbhyam sutra (method) was selected for designing of mantissa. This design handled underflow, overflow and rounding condition

D) Finding square and cube

Sriraman et al. [32] has designed binary squarer by EkadhikenaPurvena of vedic mathematics, for 32 bits squarer yields better performance than the duplex squarer, saved area almost 50% and reduced delay by 50% compared to duplex squarer.

Thapliyal et al [33] proposed square and cube architecture based on (Anurupye) Shunyamanyat and UrdhvaTiryakbhyam, it is implemented with verilog HDL for improvement in speed and area.

E) Digital Signal Processing application

Srimani et al. [34] proposed vedic multiplier which perform linear convolution and circular convolution. This multiplier is prepared in DSCH2, and the layout is generated by Microwind. The noise power have been calculated by T-Spice-13 in 45 nm Technology. Same multiplier function is implemented in Matlab, the result shows that the vedic mathematics executives in less time than inbuilt Matlab function. Savadi et al. [35] implemented for 64 bit fast Fourier transform(FFT) with vedic mathematics. This is implemented in Matlab as well as in Xilinx ISE, the results verifies that vedic sutras takes less average processing time. Anvesh et al. [36] implementedvedic multiplier for FFT with improvement in speed by reducing the numbers of adders and multipliers required in FFT calculation.

Vedic multiplier is used in cryptography. Leonard et al. [37] have efficiently used vedicmathematics for encryption and got less power consumption. Bhaskar et al.[38] have implemented RSA encryption and decryption with vedic mathematics UT sutra using VHDL to improve speed.

5. CONCLUSION:

Multiplier is one of the important block in digital signal processors. Improvement in multiplier performance is essential for getting fast results of convolution, Fourier transforms, encryption, decryption and DSP application. To achieve better performance researchers had used different techniques such as array multiplier, modified booth multiplier and Vedic multiplier these multipliers are modified using different schemes to add the partial products. Mostly used vedic sutra is Urdhvatiryakbhyam (UT). Vedic multiplier is implemented on CMOS level as well as on reconfigurable hardware such as Field Programmable Gate Array(FPGA). Both the implementations are efficient in terms of delay and power. Use of Vedic multiplier has proved significant improvement in speed of multiplication. There are 16 vedic sutras but mostly used is UT sutra, NND is used by very less researchers. There may be scope in exploring remaining vedic sutras. While studying the literature, found less papers in complex number multiplication and floating point multiplication, also transistor level implementation of these multipliers is not found. There is scope for implementation of these multiplier at transistor level.

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Effect of Preheated Palm Biodiesel on Performance and Emission of Diesel Engine

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Abstract: Due to rapid growth of automobiles, the demand for petroleum products raises day by day which is expected to rise to more than 240 million metric tonnes by 2021-22, which will further increase to around 465 million metric tonnes by 2031-32. However, the rapid depletion of petroleum products and the stringent regulations lay down by the government to engine manufacturers and consumers to follow the emission norms to save the environment from diesel engine pollution, have triggered many researchers to identify renewable alternative fuels for diesel engine. In this research work, the experimentation was conducted on 4-stroke, single cylinder, D.I. diesel engine with Diesel and various blends of Palm biodiesel. The Palm biodiesel was preheated at 60°C using preheating setup. The analysis of performance and emission of various blends of preheated palm biodiesel and neat diesel was carried out. The blend B20 and B60 gives better performance and less emission as compared to other blends. This paper presents a review on multiplier circuit implemented with different modification mainly by using vedic mathematics for reducing delay, power and area.

Key words: BTE, BSFC, NO_x, Palm biodiesel, Smoke density etc.

1. INTRODUCTION:

A diesel engine has an excellent reputation for its low fuel consumption, reliability, durability characteristics and higher brake thermal efficiency. While on other hand, diesel engine becomes the main air pollution source in the near future due to its combustion products. Polluted air leads to climate changes and affects plants, animals and human alike. In this regard, biodiesel derived from various vegetable oils such as Karanja, Jatropha, Castor, Soybean, Palm, Neem etc. considered as potential alternative fuel for diesel engine [1][3][7][8][10].

The direct usage of vegetable oil in diesel engine is restricted because of their high viscosity, poor atomization, incomplete combustion and carbon deposition on the fuel injectors. The use of vegetable oil in lower blend concentration with diesel results in better engine performance and emission close to neat diesel, but with higher blend concentration performance and emission much inferior compare to neat diesel because of increase in viscosity [2][4][5][6][11]. The viscosity of vegetable oil reduced by the process of transesterification by converting vegetable oil into methyl ester or ethyl ester known as biodiesel. The considerable work has been carried out by many researchers on performance and emission characteristics of diesel engine with biodiesel and its blends and showed significant improvement in engine performance and reduction in emission of CO, HC and smoke, but NO_x emission was higher with biodiesel and its blends because of their higher oxygen content [9][12][13]. In the present research work, the preheated biodiesel derived from palm seed oil has been used in diesel engine to analyze the performance and engine characteristics. The properties of Palm biodiesel are given in Table I [14]

Table I Properties of palm biodiesel [14]

Viscosity at 40°C, mm ² /s	4.1
Calorific Value, kJ/kg	37254
Density @ 15°C, kg/m ³	875.1
Specific gravity @ 15°C	0.8722
Pour Point	-12°C
Flash Point	175°C
Cetane number	52

Visual appearance	Dark Brown liquid
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2. PREHEATING SETUP

Before experimentation on diesel engine, the Palm biodiesel was heated using preheating setup as shown in Fig. 1 which consists of horizontal fuel tank placed in water storage tank.



Fig.1 Preheating setup

A heating coil is provided in the water tank to heat the water. When water is heated, heat is transferred to Palm biodiesel fuel through fuel tank and biodiesel gets heated. A temperature sensor is deep in water to sense the temperature of water. When 60°C temperature is attained the heating was stopped.

3. EXPERIMENTATION

The experimentation was carried out to analyze the performance and emission characteristics of preheated palm oil biodiesel. Biodiesel and its blends B20, B40, B60, B80 and B100 were used to test the engine of the specifications mentioned in Table II. The experiments were conducted on a single cylinder, 4 stroke D.I. diesel engine. During experimentation palm biodiesel was preheated and maintained at 60°C. The engine was loaded using the eddy current dynamometer. The engine speed in rpm was sensed using a sensor pre-installed in the dynamometer and was recorded from the display on the control panel of the dynamometer.

Table II Specifications of engine

Type	Single-cylinder, four-stroke, compression ignition diesel engine
Compression ratio	16.5:1
Bore	80 mm
Stroke	110 mm
Rated output	3.7 kW
Rated speed	1500 rpm
Dynamometer	Eddy current, water-cooled with loading unit

At each blend, the engine was stabilized for 20 minutes and then performance and emission parameters were measured. The various graphs were plotted between Brake thermal efficiency and BMEP, BSFC and BMEP, Smoke density and BMEP and between NOx and BMEP as shown in Fig.2, Fig.3, Fig.4 and Fig.5.

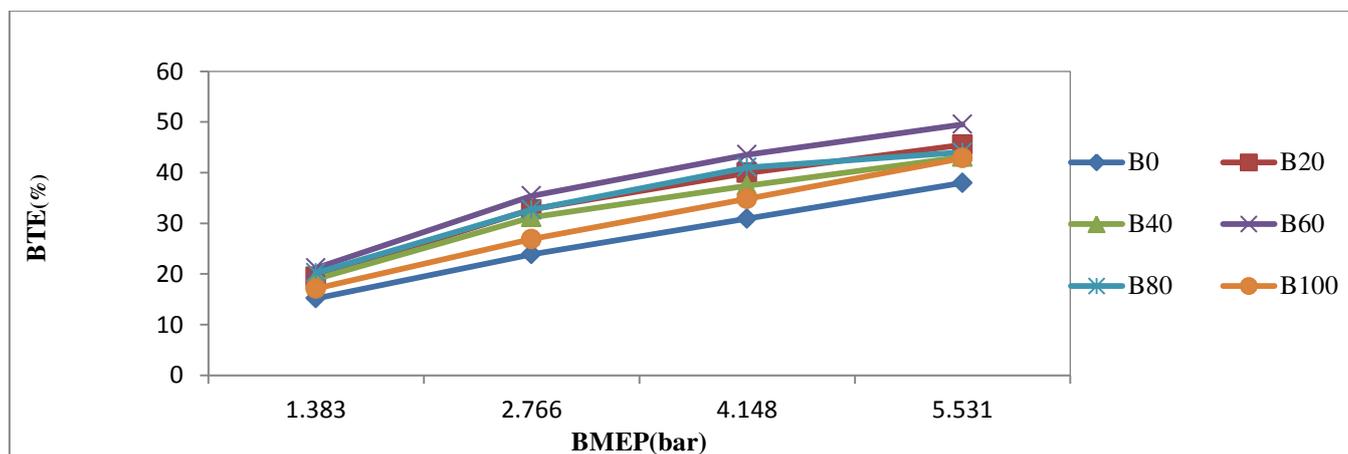


Fig. 2 BTE vs BMEP

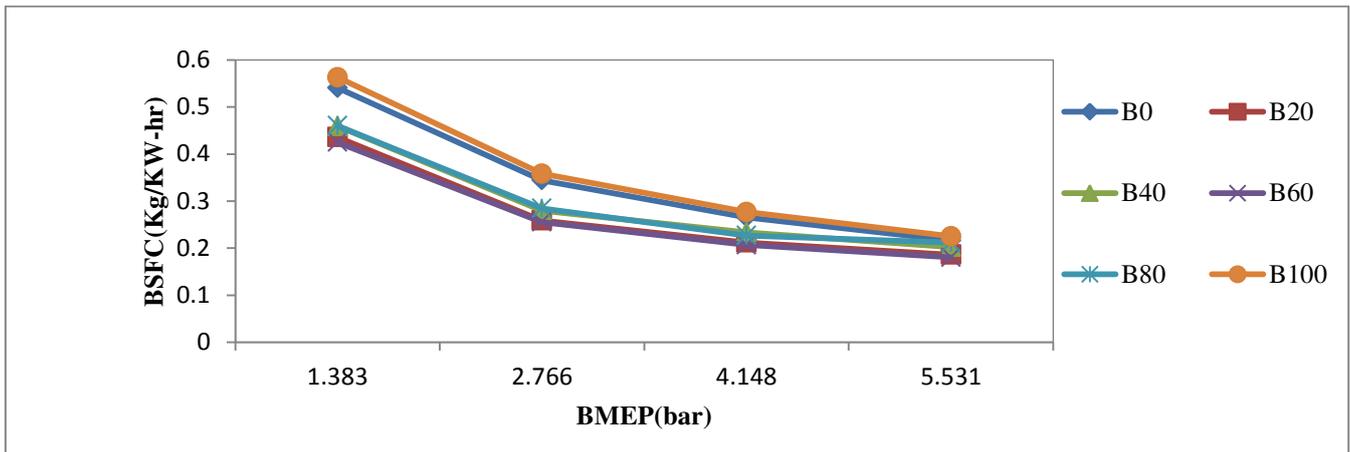


Fig. 3 BSFC vs BMEP

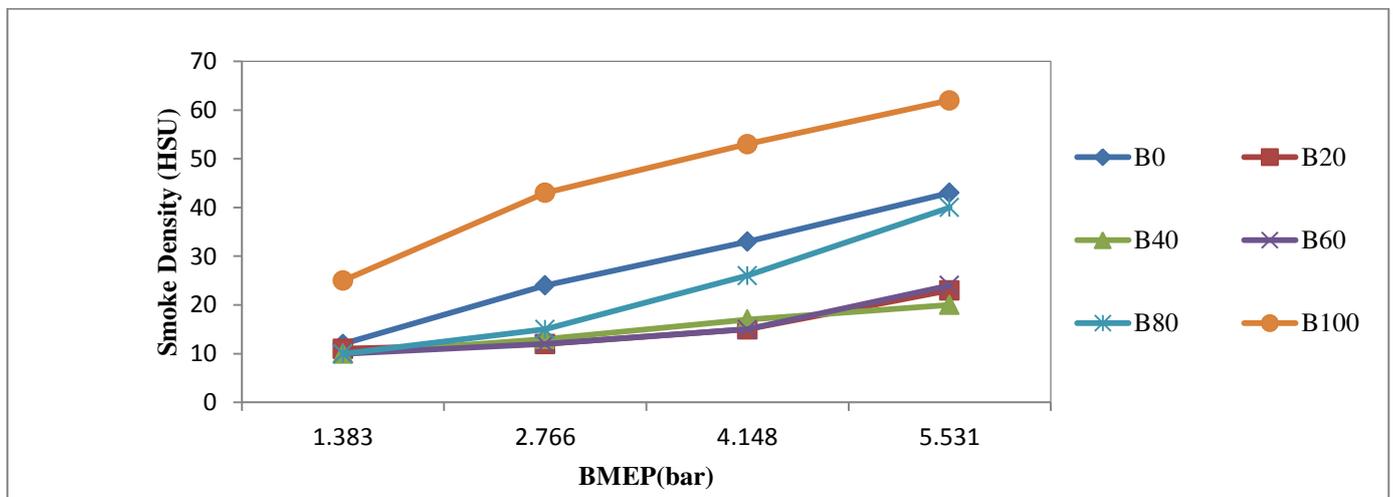


Fig. 4 Smoke Density vs BMEP

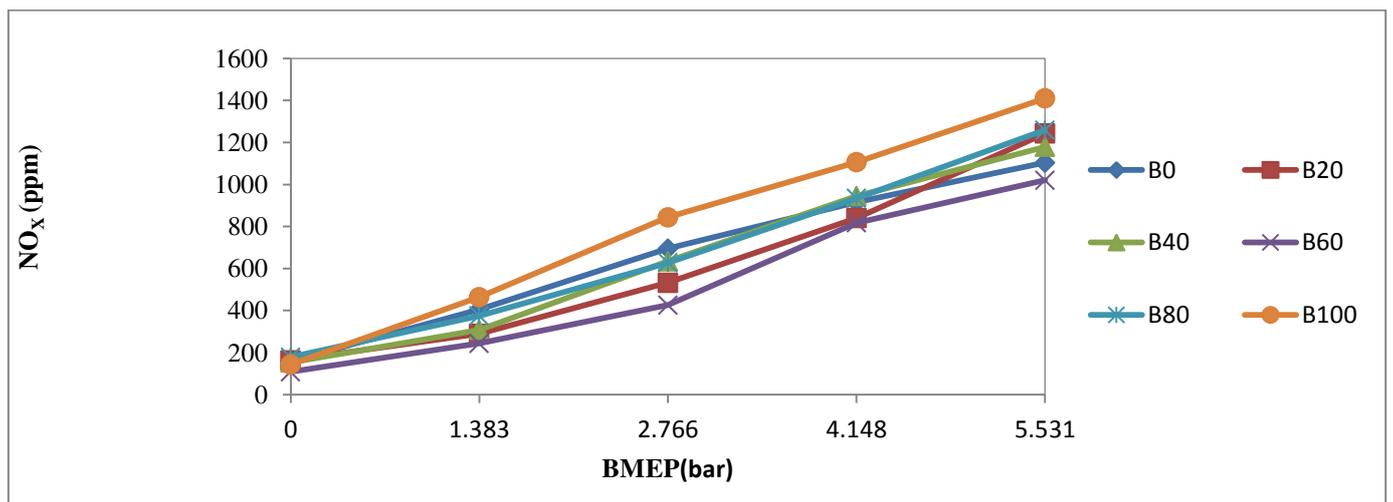


Fig. 5 NOx vs Biodiesel blend

4. RESULTS AND DISCUSSIONS

Brake Thermal Efficiency:

The variation of Brake thermal efficiency with brake mean effective pressure for different blends are shown in Fig.2. For all blends, BTE increases with increase in brake mean effective pressure. This is due to a reduction in heating value and increase in power with increase in load. The lower brake thermal efficiency obtained for B0, is due to increase in fuel consumption. The maximum brake thermal efficiency of blends is observed for B60 at full load.

Brake specific fuel consumption:

The variation of brake specific fuel consumption is shown in Fig.3. For all blends tested, brake specific fuel consumption decreases with increase in brake mean effective pressure (from 1.383 bar to 5.531 bar). This reduction is due to the higher percentage of increase in brake power with load as compare to fuel consumption. The lowest Brake specific fuel consumption is predicted for B20 at each and every load. Also, along with B20, blend B60 shows minimum BSFC. The highest brake specific fuel consumption is observed at B100. This is due to the combined effect of low heating value and high density of palm biodiesel.

Smoke density:

For all blends tested, smoke density increases with increase in brake mean effective pressure shown in Fig.4. This increase in smoke is more at low loads as compared to high loads. The smoke is formed due to incomplete combustion of fuel. It is highest for B100 and lowest for B20. The reasons for decreasing smoke density with palm biodiesel blends is the presence of oxygen in the biodiesel and reduce viscosity, which in turn helps for complete combustion.

Nox:

It is observed that as load increases the NO_x formation increases and attains maximum at full load as shown in Fig.5. NO_x is highest for B100, this may be due to small amount of nitrogen contents present in Palm biodiesel, which contributes towards NO_x production. The graph indicates less NO_x for blend B20 and B60. This may due to decrease in heating value which reduces combustion temperature and which in turn reduces NO_x.

5. CONCLUSION:

It can be concluded that, the viscosity of palm biodiesel blend reduces by heating the palm biodiesel, which helps to improve the performance of engine. From overall observations it can be stated that blend B20 and B60 of palm biodiesel shows an optimized trend in almost all parameters at 60°C preheating temperature. In the view of positive results obtained from the experiments, it is rational to say that palm biodiesel can be used as a substitute for petroleum diesel in diesel engines and a green renewable energy to meet the energy demands of the future.

ABBREVIATION

B0 - Diesel 100%
B20 - Palm Biodiesel 20% +Diesel 80%
B40 - Palm Biodiesel 40% +Diesel 60%
B60 - Palm Biodiesel 60% +Diesel 40%
B80 - Palm Biodiesel 80%+Diesel 20%
B100- Palm Biodiesel 100%
BSFC - Brake Specific Fuel Consumption (kg/kW h)
BTE - Brake Thermal Efficiency (%)
Nox -Nitrogen oxide (ppm)
DI - Direct Injection

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SIMULINK MODEL OF QUARTER CAR AND IT'S EXPERIMENTATION ON SUSPENSION TEST RIG

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Abstract: This paper focuses on the effect of suspension parameters vertical acceleration. The vertical force transferred by the tyre of wheel is directly depending on the vertical force. To measure this vertical acceleration and its maximum value for the different road input is carried out in the MATLAB Simulink toolbar. For analysis purpose quarter car model is considered.

Keywords: Simulink model, mathematical modelling, quarter car model

1. INTRODUCTION:

Comfort in vehicle ride plays a vital role in the vehicle design. This becomes one of the important design considerations. The performance of driver is directly related to the ride comfort. There are adverse effects of low frequency vibration on human being. The mathematical models are able to convert the system into mathematical equations so the equations will be solved and some rigid conclusions can be drawn for proper and optimised performance.

Figure 1 shows quarter car model considers only one wheel of car showing all its important parts. For vibration and vertical acceleration analysis its two degree of freedom model is used as shown in fig, 2.

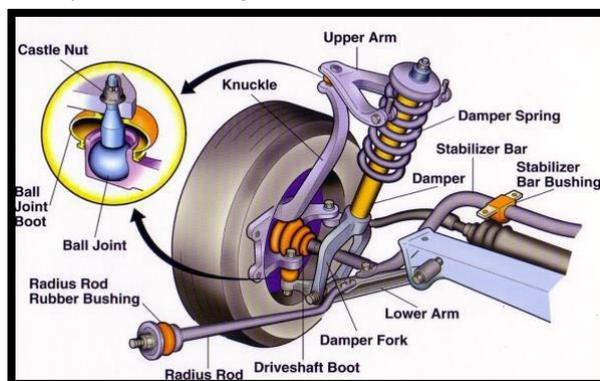


Fig.1

2. Two Degrees of Freedom (DOF) Quarter-Vehicle Model:

Figure 2 shows a simplified 2 degrees of freedom (DOF) quarter-vehicle model. It consists of a sprung mass (m_2) supported by a primary suspension, which in turn is connected to the unsprung mass (m_1). The tire is represented as a simple spring, although a damper is often included to represent the small amount of damping inherent to the visco-elastic nature of the tire. The road irregularity is represented by q , while m_1 , m_2 , K_t , K and C are the un-sprung mass, sprung mass, suspension stiffness, suspension damping coefficient and tire stiffness, respectively. This is very common model that can be considered while analysing the different parameters of suspension. In this model single suspension is considered for analysis purpose, which is shown in the fig 1.2. The tire has been replaced with its equivalent stiffness and tire damping is neglected. The suspension, tire, passenger seat are modelled by linear springs with dampers.

q =road input (m), K_t = stiffness of tire (N/m), m_1 = mass of unsprung elements(kg), m_2 =sprung mass (kg), K = stiffness of sprung mass (N/m), C =Damping coefficient (N/m/s), z_1 =displacement of unsprung mass (m), z_2 =displacement of sprung mass (m)[1]

The two degree of freedom is due to excitation of sprung and unsprung masses.

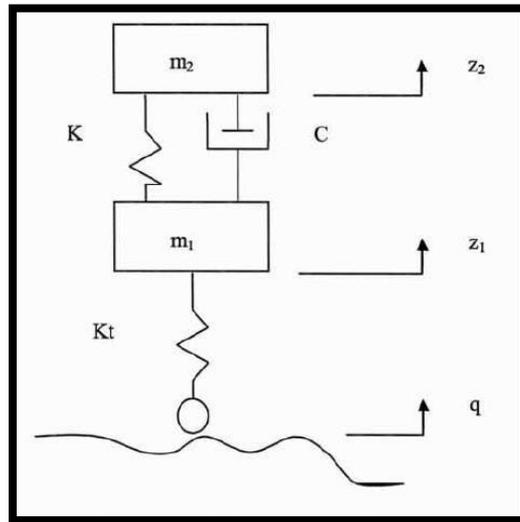


Fig 2Two-DOF or Quarter Car Model

2.1 Equations of motion for 2 DOF system and Simulink model

For Fig 2 equations of motions can be derived.

$$m_2 \ddot{z}_2 + C(\dot{z}_2 - \dot{z}_1) + K(z_2 - z_1) = 0$$

$$m_1 \ddot{z}_1 + C(\dot{z}_1 - \dot{z}_2) + K(z_1 - z_2) + K_t(z_1 - q) = 0$$

With Simulink, one can move beyond idealized linear models to explore more realistic nonlinear models, factoring in friction, air resistance, gear slippage, hard stops, and the other things that describe real-world phenomena. Simulink turns your computer into a laboratory for modeling and analyzing systems that would not be possible or practical otherwise.

Above equation is the governing equation of the quarter car model. This equation can be easily solved in Simulink. Simulink also includes a comprehensive block library of sinks, sources, linear and nonlinear components, and connectors. If these blocks do not meet your needs, however, you can also create your own blocks. The interactive graphical environment simplifies the modelling process, eliminating the need to formulate differential and difference equations in a language or program.

This model is like the laboratory. We can change one parameter and can see the effect on displacement, acceleration and velocity.

The simulation results can be put in the MATLAB workspace for post processing and visualization.[4]

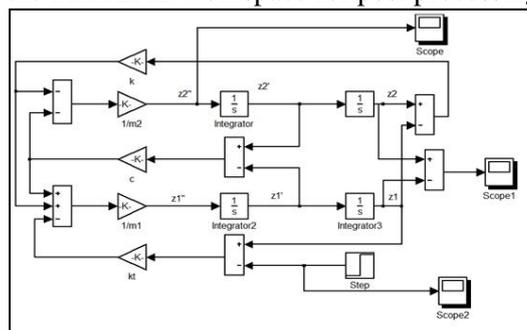


Fig.4.Simulink block diagram of the suspension system

Plots for the Simulink: In simulink results are obtained by varying suspension parameters as follows:

- Sprung mass from 100 to 250 kg with equal intervals
- Change in suspension spring stiffness
- Change in damping coefficient
- Change in unsprung mass
- Effect of change in tire stiffness

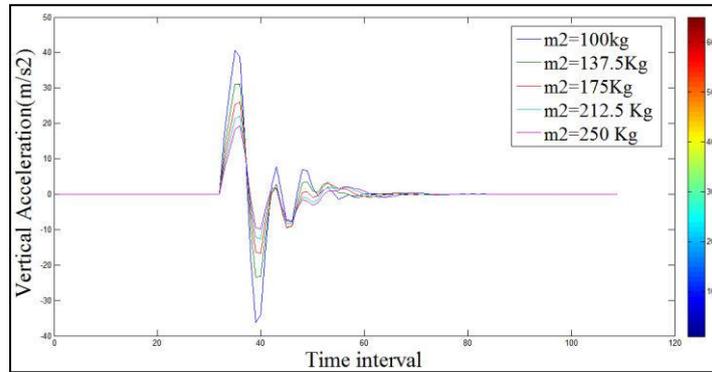
Plots and respective acceleration and body travels are as follows:

2.2. Change in sprung mass

Table1.2Acceleration values at different sprung mass

Mass Kg	Vertical Acceleration		Body Travel (m)	
	Max	Min	max	min
100.00	40.6414	-36.2788	0.0714	-0.0958

137.50	31.1445	-23.3874	0.0576	-0.1060
175.00	25.9298	-16.7602	0.0531	-0.1125
212.50	22.1732	-12.6394	0.0580	-0.1169
250.00	19.3520	-9.8861	0.0587	-0.1201



Change in suspension spring stiffness:
Table2 Acceleration values at different spring stiffness

stiffne ss N/m	Jerk in Z m/s ²		Body Travel m	
	max	min	Max	Min
10000	16.8320	-10.3773	0.0411	-0.1262
12291	17.4679	-10.0866	0.0472	-0.1247
14583	18.0963	-9.8423	0.0521	-0.1232
16874		-9.7336	0.0559	-0.1217
19165	19.3314	-9.8396	0.0587	-0.1202

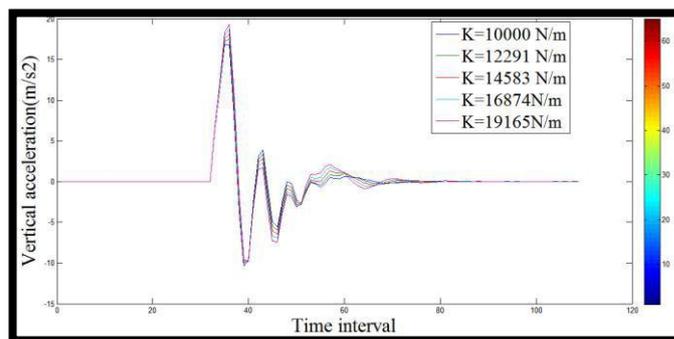


Fig.5 Effect of change in suspension stiffness

2.3. Change in damping coefficient

Table 3 Acceleration values at different damping coefficient

damping coefficient N/m/s	Vertical Acceleration m/s ²		Body travel(m)	
	Max	Min	Max	Min
800	15.9339	-9.0880	0.0807	-0.1355
925	16.4648	-	0.0742	-0.1312
1050	17.5510	-8.9557	0.0685	-0.1271
1175	18.5702	-9.7732	0.0634	-0.1233
1300	19.5265	-	0.0589	-0.1197

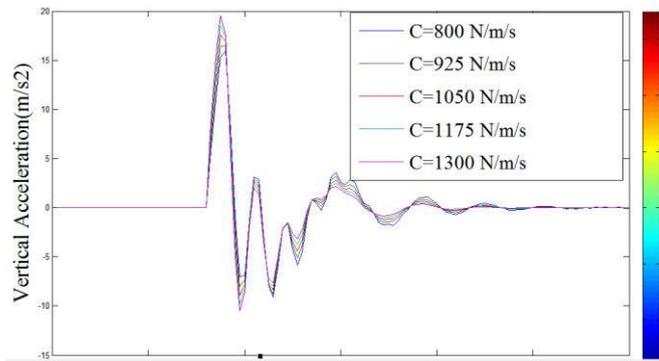


Fig. 6 Effect of change in damping coefficient

2.4. Change in unsprung mass:

Table 4. Acceleration values at different unsprung mass

unsprung Mass	Vertical Acceleration		Body Travel	
	Max	Min	Min	Max
50	24.3433	-9.1475	0.0483	-0.1196
62.5	22.0938	-9.3245	0.0483	-0.1189
75	21.6044	-10.0099	0.0485	-0.1192
87.5	20.7262	-10.2262	0.0539	-0.1209
100	19.7185	-10.7132	0.0590	-0.1202

2.5. Effect of change in kt

Table 5. Table Acceleration values at different stiffness values

Kt	Vertical Accln m/s ²		Body Travel m	
	Max	Min	Max	Min
100000	14.4766	-7.5293	0.0543	0.1027
117500	16.0433	-7.9088	0.0557	0.1064
135000	17.3594	-9.1366	0.0581	0.1092
152500	18.4383	-9.8698	0.0577	0.1154
170000	19.2931	-9.7895	0.0587	0.1203

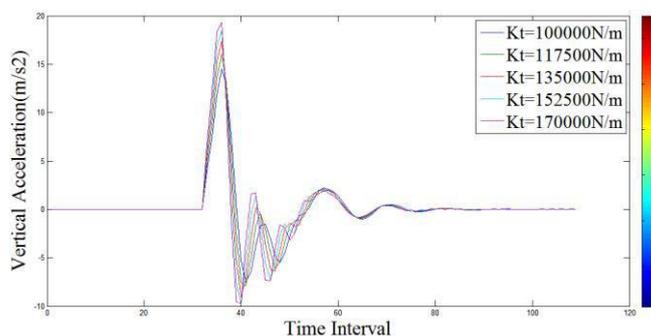


Fig7. Effect of change in tire stiffness

3. RESULTS AND VALIDATION:

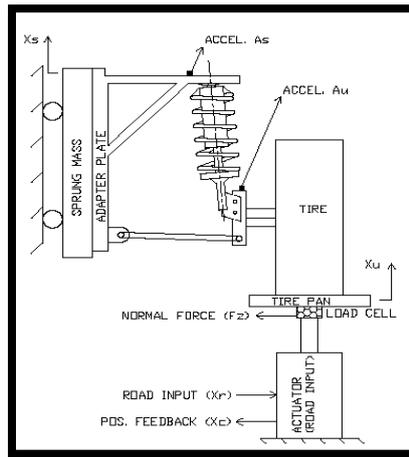


Fig.8 Test rig



Fig 9.Experimental Setup

3.1 Result analysis

The results obtained were analytical and experimental in nature and were to be compared simultaneously for accuracy. The results are given in subsequent topics.

3.2 Result comparison:

After simulating the McPherson strut in MATLAB, the results were obtained in graphical format. The results obtained were readable and self explanatory in nature.

As shown in below figures, the results on Matlab simulation are given for various vehicle suspension parameters, which are self explanatory in nature.

The input data for suspension for two strut as follows as follows,

$$\begin{aligned}
 m_2 &= 250 \text{ kg} \\
 m_1 &= 100 \text{ kg} \\
 C &= 1300 \\
 K &= 16195 \text{ n/m} \\
 K_t &= 170000 \text{ N/m}
 \end{aligned}$$

Table 6 Suspension Properties

Property	Strut1	Strut2
C (N/m/s)	1050	1300
K (N/m)	12283	19165

Where,

m_2 = sprung mass or body mass;

m_1 = unsprung mass;

C = suspension damper damping coefficient;

K = suspension spring stiffness;

And Kt = Tyre stiffness.

The simulation was carried at different values by changing the different parameters of the suspensions. The results of the same are shown in the previous section.

Following plots shows the response to the step input of 0.1m and speed of 30 kmph for two Struts are available with us

For Change in sprung mass

Table 7. Comparison of Simulink and Experimental result for change in Sprung mass

S r. N o.	Mass in Kg	Simulink Acceleration(m /s ²)		Experimental Acceleration(m/s ²)	
		Max.	Min.	Max.	Min.
1.	100	40.64	-36.27	30.25	-29.3782
2.	137. 5	31.14	-23.38	27.38	-20.1872
3.	175	25.92	-16.76	21.54	-12.5684

Change in spring stiffness

Table8.3 Comparison of Simulink and Experimental result for change in Spring stiffness

Sr. No.	Sprin g stiffne ss N/m	Simulink Acceleration(m /s ²)		Experimental Acceleration(m/s ²)	
		Max.	Min.	Max.	Min.
1.	12283	17.46	-10.08	15.83	-11.23
2.	19165	19.33	-9.83	17.85	-8.32

Change in Damping

Table8.4 Comparison of Simulink and Experimental result for change in damping

Sr .N o.	Damp ing coeff. N/m/s	Simulink Accel(m/s ²)		Experimental Accel(m/s ²)	
		Max.	Min.	Max.	Min.
1.	1050	17.55	-8.95	13.78	-7.4523
2.	1300	19.52	-10.51	17.45	-8.2317

4. EXPERIMENTAL RESULTS:

Out of the four parameters viz. road distance, body travel, body acceleration and suspension deflection the body acceleration is the most important and considerable parameter to be observed and kept within the permissible limits. Hence in the present experimental tests as per the availability of instrumentation and the economy of project is concerned the concern has been given to body acceleration.

The experimental setup (**Fig.8 and Fig.9**) was capable of measuring only the body acceleration. The body acceleration was given in the form of tabulated data on HMI as an .xls file reading the acceleration values at particular time interval. The acceleration values were recorded at regular interval of 10 second of simulation time. The tabulated data in the excel file was taken on the portable memory drive as the HMI facilitates the port for USB pen drive for data interaction. The Simulink results and actual results are varying by 15%-20% due to following conditions.

- The analytical analysis uses the standard equations, methods which may or may not consider the actual working conditions.
- The analysis occurs on the basis of many assumptions and considerations, such as there is no material defect in the specimens that practically may have e.g. voids, nonlinear material properties, anisotropic nature, manufacturing defects, defects induced while handling.

- The simulation method also assumes that the specimen for which the model is developed has the perfect geometry and lacks no errors in their alignments, positioning and working.
- There is no human error involved while the results are being recorded unlike in experimental tests.

5. CONCLUSION:

5.1. Effect of change in sprung mass:

From the result of simulation it is clear that initially the less amount of sprung mass causes the large vertical acceleration. But as sprung mass goes on increasing then vertical acceleration sharply decreases. But sprung mass can't be increased beyond 175 Kg otherwise the high dynamic forces strikes the shaker. Thus high sprung mass gives comfort but striking of sprung and unsprung mass should not takes place. The simulation result shows that we have extended the mass up to the 250 kg .But actually we take it up to 175 kg for safety purpose.

5.2. Change in suspension spring stiffness:

Simulation shows that as suspension spring stiffness increases the vertical acceleration increases. From results it can be proved that 18.63% change in the stiffness changes vertical acceleration only by 3.64%.It does not mean that we should use less stiffness spring. That causes increase in flexibility. Thus it should be such that it will reduce vertical acceleration as well as should give the stability.

In suspension spring we take five different values but we are having the two struts thus experimental and simulation values are compared for those two values only.

5.3. Change in the damping coefficient:

The damping coefficient damps the amplitude suddenly and brings system to the mean position. The vertical acceleration increases by 3.2% while an increase in the damping coefficient is increased by 13.5%.

5.4. Change in the unsprung mass:

The unsprung mass of quarter car model is the $\frac{1}{4}$ th of the total car. This mass is not being changed practically. But still we can get its effect on the vertical acceleration in Simulink.

As unsprung mass increases the vertical acceleration goes on decreasing.

5.5. Tire stiffness:

Tire stiffness is dependent of the pressure in the tire. The minimum pressure in the tire should be maintained. At that air pressure the particular stiffness should be considered. As tire air pressure increases the rigidity of tire and transfers the vibrations. Thus, tire pressure increases the stiffness increases and vertical acceleration also goes on increasing.

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A New Approach of Vehicle Number Plate Recognition Using Template Matching and Neural Network as Hybrid Method

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Abstract: In this research work main aim is to focus on to pattern matching and analysis of image for vehicle's number plate recognition using template matching and neural network as hybrid method. In this research work car images was tested by applying template matching algorithm neural network as hybrid method out of many images of vehicle's number plate recognition done correctly. Some of images are wrong result due to distance, imagesize, angle of view, condition of weather or illumination condition etc. pattern matching and analysis of number plate recognition system have many applications like payment of parking fees; toll fee on the highway; traffic monitoring system; border security system; signal system etc.

Key Words: Introduction, Proposed system, Experimental result and analysis

1. INTRODUCTION:

Vehicle Number plates have been used for identification of vehicles all over the worlds. Vehicles have been identifying either not only manually but also automatically. Automatic vehicle identification is pattern matching technique of identify vehicles by their number plates. Automatic vehicle identification systems are used not only effective traffic control but also security applications such as access control to restricted areas of parking and tracking of wanted vehicles at various place. Number plate recognition is best method for Vehicle identification. Number plate recognition system is difficult compared to the over other than Indian license plate as there is no standard followed for the aspect ratio of license plate.

The pattern matching and analysis of number plate task is challenging because of the nature of the light. Experimentation of pattern matching and analysis of number plate detection has been conducted from last seen year; it is still a challenging task. Number plate detection system passes an input image to identify some local patches of images containing license plates. Since a plate can present anywhere in an image with various sizes, it is used to check every pixel of the image to locate it. In parking area, number plates are used to calculate duration of the parking at various places across world. When a vehicle enters an input gate, number plate is automatically recognition by various methods.

2. LETURATURE SURVAY:

There are various methods to pattern matching and analysis of image for number plate recognition system as Shan Du. [1] proposed a car number plate recognition system. This system has different color image inputs of a car and the output given the registration number of that car. The system has three main steps to get output as desired information. Those are categories as plate localization, character segmentation and character recognition. First step is the input number of plate is extracted from the original image, and then the characters from it are isolated, and finally output as each character is recognized. The algorithm was developed using a set of training images. This system uses edge detection technique to detect the „region of interest“, where the number plate can be occurred. Then some morphological operators are applied to detect the number plate. Chengpu Yu [2] presents input as vehicle license plate extraction algorithm on basis improved Roberts's detector and morphological operation. In Roberts's operator added two direction template was compensate not only the breaks of the edge but also make it fully connected together. Then detect edge by using selecting the appropriate threshold for Roberts's operator was utilize morphological analysis of input image to obtain candidate regions of license plate, performed analyze candidate regions on connected component, finally position plate region. The experimental results was that algorithm can well suppress the impact of

noise on the detection of the target area in the image, but also required shorten the time of license plate location, valid license plate positioning along with valid output.

3. EXISTING METHOD:

Proposed method was extract Korean license plate based on different color of the plate. In this method neural network was used for extracting color of a pixel by HLS values of eight neighboring pixels and a node of maximum value is chosen as a representative color. Comelli et. al. [3] proposed a method which first applies two neural network-based filters to input color image, it was used a post-processor to combine the two filtered images in order to locate license plates. Kim et. al. [4] was presented a vehicle number plate recognition system. It consists of three modules, each of which is an integration of different vision technologies. One of is the car extraction module which detects car in given image sequence. Tianding Chen [5] proposed a character localization method for color images. The method operates directly on the compressed image used discrete wavelet transforms, neural networks. new and fast vertical edge detection algorithm (VEDA) is proposed for license plate extraction. VEDA given that it is faster than Sobel operator by about seven to nine times. The block-based method was presented in the literature. In [6], blocks with high edge magnitudes are identified as possible license plate areas. Since block processing does not depend on the edges of the license plate. *ALPR recognizes a vehicle's license plate number from an image or images taken by either a color, black and white, infrared camera. It was fulfilled by the combination of a lot of techniques, such as object detection, image vision, and pattern recognition. ALPR of number plate is also known as automatic*

4. PROPOSED SYSTEM:

Pattern matching and analysis of image for Indian vehicle's number plate recognition using template matching method. Template matching is a method that compares portions of images to one other image. Sample of image may be used to recognize similar objects in the source image. The matching process moves the template image to all possible position in a larger source image to all possible positions in a larger source image. Matching is done on a pixel by pixel basis. Template size is fixed and it leads to inaccurate recognition. The ALPR system that extracts a license plate number from input given image has been composed of four stages [7]. The first stage is to acquire the car image using a camera. The parameters of the camera, such as the type of camera, camera resolution, shutter speed, orientation, and light. The second stage of proposed research work to extract the license plate from the image based on some features like boundary, different color, and the existence of the characters. The third stage is to segment the license plate and extract the characters by using their color information, labeling them, or matching their positions with templates. The fourth stage is to recognize the extracted characters by template matching or using different classifiers, such as neural networks, fuzzy classifiers etc. Fig. 1 shows the structure of the ALPR process. The performance of an ALPR system depends on each individual stage. The purpose of this paper is to provide researchers with a systematic survey of last work done by other people ALPR research by categorizing existing methods according to the features they used, analyzing not only pros but also cons of these features, and comparing them in terms of recognition performance and processing speed.

Input Image (Image acquisition): Image acquisition is the process of obtaining an image from the mobile camera or scanner. This is the first step of any vision based systems. In my research i acquire the images using a digital camera. my aim is to get the frontal input image of vehicles which presents license plate. The remaining stages of the system works in offline mode. **Gray scale image:** After acquiring the image, the very next step is to derive the gray scale image. **Binary image code to convert an image to a gray scale:**

STEP1: Load input image as vehicle number plate

STEP2: Retrieve the properties of image

STEP3: Get access image data of vehicle number plate

STEP4: For each height and for each width of the image, convert image to gray scale by using average of r,g,b values of the image convert to gray scale manually

STEP5: Display output image after converting to gray scale.

A) Preprocessing: Preprocessing is one of the most fundamental step to carry out on the image pre-order to develop higher order algorithms. The image was transformed to gray scale and resized to 480 x 640 pixels to increase the speed of execution. **Gray scale Conversion:**

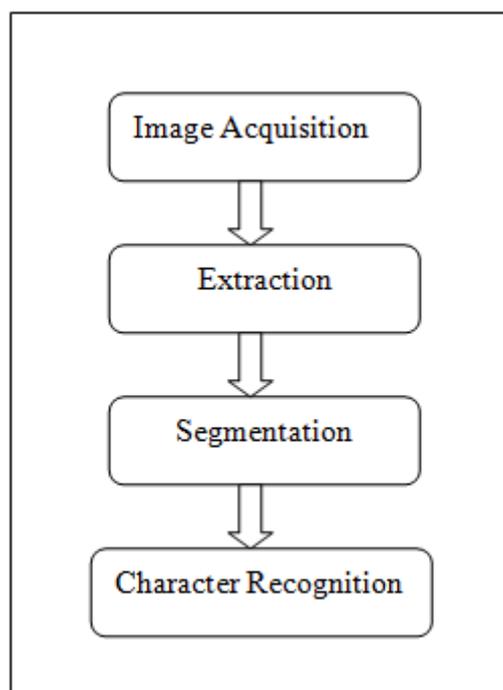
For every (i,j)th 24 bit RGB pixel, 8 bit Grayscale pixel is calculated by using R,G and B values and using the formula:

$$\text{gray}(i,j) = 0.59 * R(i,j) + 0.30 * G(i,j) + 0.11 * B(i,j)$$

Image Acquisition
Image Acquisition

Median Filter: Median filter is a non-linear digital filter used for removing salt and pepper noise from an image. It replaces the gray value of a pixel by using median of the gray values of its neighbours. We have used a 4x4 mask.

Fig 1 Proposed System



Proposed Algorithm:

Input: Vehicle number plate image

Output: Recognition of vehicle number plate

Step1: Input vehicle number plate image in RGB

Step2: Convert RGB to Binary image

Step3: Convert Binary image to Gray scale

Step4: Extraction

Step5: Segmentation

Step7: Neural network

Step8: Template matching method

Step9: Recognition of vehicle number plate

5. COMPARISON AND RECOGNITION:

Pattern matching and analysis of number plate recognition system in which the segmented number or characters will recognize and converted into text for further processing. Pattern matching and analysis of number plate recognition involves different process like image as i/p, feature extraction, segmentation and template matching algorithm. Here the numbers or characters are normalized to as per standard number plate. Templates for numbers and characters are not only prepared but also normalized into blocks with no borders or white spaces that surround the characters as shown Fig.2 as per standard template of English alphabets and numerals. Similar process was used to

segmentation the characters from i/p image. Each character OR number is matched with the according standard template using correlation method to measure the equality between images. Correlation coefficient value ranges from 0 to 1. The value 0 says minimum match and value 1 says maximum match. Feature extraction is the key step in ANPR system, which includes the correctness of the system significantly. The aim of in this phase, given an input image, is to produce a number of present regions, with high correct output of containing number plate and validate for true number plate.

Image Acquisition and Pre-processing In this system a high resolution of digital camera images are used to acquire an image. Images are resized to (648X 486). All the processing steps are executed on gray scale image. Pre-processing is mainly used to enhance to reduce the noise in the image. In order to solve the problem of input image as low quality but also low contrast in car images. Images of number plate as input are converted by using method gray scale image.

As given input of vertical edge detection the numbers or characters on given number plate region contain abundant edges as compared to background area of image. This feature is given for locating the plate area from the input image. Sobel vertical edge detection is used to find out the regions of image which have may present high pixel variance value [8]. To extract candidate number plate area from the entire image, threshold has been used to select rows which are having particular white pixel density.

Plate Area selection morphological operations used to remove unrelated objects in the image. Dilation and morphological are used to extract given plate areas from the total image. Many times background areas of number plate may also get declared as plate for recognition. So to remove the fake number plate validation is done using the aspect ratio of the plate and horizontal cuts [09] in the number plate.

Given number plate extraction after the detection of candidate number plate area, Bounding Box used to extract input plate area from the original image. From the Bounding Box analysis, respective row and column represents of plate area are found out. Once the indices of number plate are seen, the given number plate is extracted from original gray scale image.

The aim of feature vector of image is to define compare features of the characters or numbers. taking the most correct feature of each character can not only facilitate data visualization and data knowing, reduce the measurement of value, storage requirements for image, training, method and utilization time, particularly when the features of image are redundant.

Initially stage, the centroid of the character image is determined. With respect to centroid, number of operations along the axes, 0 to 1 and 1 to 0, up to the boundary of character or number have been counted. Transitions are specified according to axes with predetermined angles.

Character Segmentation: Segmentation is most important processes in the given input number plate recognition, so all further steps rely on it. If the segmentation fails, a character may be incorrectly divided into two pieces, or two characters can be improperly merged together. We can use a horizontal forecast of a number plate for the segmentation, or one of the more sophisticated methods, such as segmentation using the template matching. In this segmentation i use two types of segmentation: a. Horizontal segmentation b. Vertical segmentation. First i have been performed vertical segmentation on the number plate then the characters or numbers are vertically segmented. After performing vertical segmentation we have to perform horizontal segmentation by performing this i get character from the number plate.

Template matching algorithm: Template matching method block is used for matching the template image for process performed on with given image as input. The template image and the input image for pattern matching and analysis of number plate recognition for images are of same orientation and resolution. Size of template image must smaller than the input image. Template matching method belongs to Computer Vision System Toolbox, from analysis and enhancement library stored in disk. Port one of is used to input the input image and port two is used to input the template image. Output port deals the output as best not only match location but also template metric value.

A neural network is an information-processing capability that is influenced by the same way as the biological nervous system, like brain. ANN is composed of large amount of highly interconnected processing element and neurons.

Every neuron has their local memory and the output of each neuron depends only upon input signal arriving at the neuron. The basic architecture of neuron layers are: input layer, hidden layer and output layer. The information flows from input units to output units, strictly in a feed-forward manner. There is no feedback connection and data can be processed using multiple layers of units. The dynamical properties in feed forward of the network are important. In other applications, the significant changes due to output neurons activation, such that the transient behavior constitutes the output of the neural network. Some other artificial neural network architectures are adaptive resonance theory maps, Elman network, competitive networks, etc. depending on the properties and necessary condition of the application. [13] Individual weight is multiplied with every input neuron at the entrance. Intermediate section of neuron is a sum function which sums all weighted inputs and bias. At output side, transfer function is calculated using the summation of previously weighted inputs and bias is passed via activation function.

6. EXPERIMENTAL RESULTS AND ANALYSIS:



Fig.2 Load image

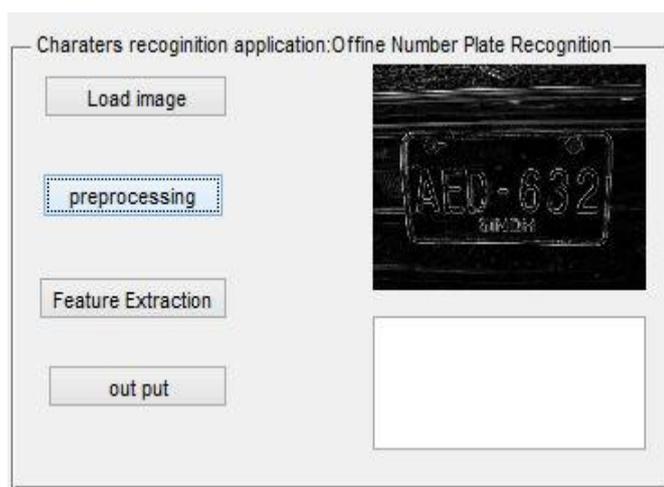


Fig.3 Pre-processing on load image of output

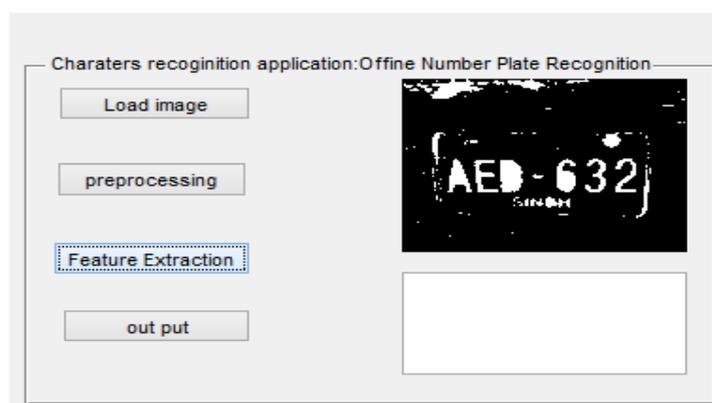


Fig.4 Feature extraction of number plate

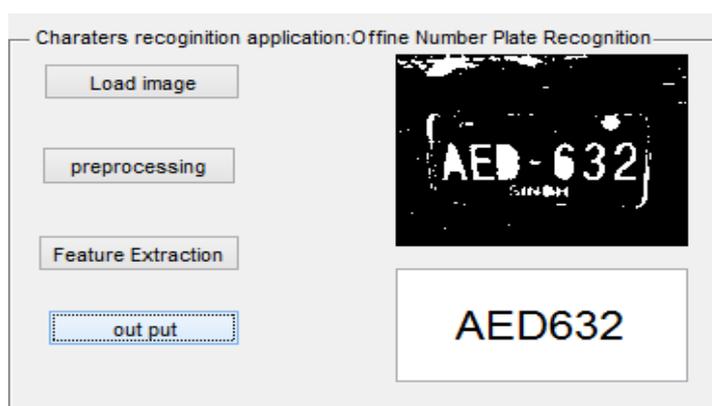


Fig.5 recognition of vehicle number plate.

As shown above figures pattern matching and analysis of vehicle plates recognition performed on various images and successfully recognition this system performed using template matching method.

Application of Number plate Recognition:

- Parking :- The NPR is used to automatically enter prepaid members and calculate parking fee for nonmembers.
- Access control :- A gate automatically opens for authorized members in a secured area, thus replacing or assisting the security guard.
- Tolling :- The car number is used to calculate the travel fee in a toll-road or used to double check the ticket.
- Border Security :- The car number is registered in the entry or exits to the country and used to monitor the border crossings.
- Traffic Control :- The vehicles can be directed to different lanes according to their entry permits. The system reduces the traffic congestions and number of attendants.
- Airport Parking :- In order to reduce ticket frauds or mistakes, the NPR unit is used to capture the number plate and image of the car [15].

7. CONCLUSIONS:

I have implemented number plate recognition. Our algorithm successfully detects the number plate region from the image which consists of vehicle number & then character segmentation, recognition .I have applied our algorithm on many images and found that it successfully recognition. An algorithm for pattern matching and analysis of vehicle number plate recognition system a) input image b) preprocessing c) feature extraction d) segmentation e) output is presented. The recognition rate achieved using neural network and template matching 100%.The false may recognition due to size, character shape, distance, camera angle etc.

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Clustering based Energy Efficient Routing Algorithm for Wireless Sensor Network

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Abstract: Lifetime of WSN is totally depend upon how efficiently you utilizes the energy of overall network, to enhance the lifetime of the network, energy-aware protocols are proposed which use the energy minimization techniques and multi-hop paths routing. However, multi-hop paths and complex calculations at nodes introduce delay and processing overhead. Providing energy-efficiency becomes a scalability limitation. Many energy efficient routing algorithms and protocols have been proposed to prolong network lifetime for WSN. The present study propose an energy efficient distance-aware routing algorithm with multiple mobile sink for WSNs, where sink nodes will move with a certain speed along the network boundary to gather monitored data. The effect of multiple mobile sink nodes on energy consumption and network lifetime is studied. The present study is effectively focus on the selection of mobile sink node number and the selection of parking positions, as well as their impact on performance metrics above. It has been observed that both mobile sink node number and the selection of parking position have important influence on network performance and lifetime of WSN.

Key words: Wireless Sensor networks, Routing; Mobility; Energy Efficiency; Connectivity.

1. INTRODUCTION:

Wireless sensor network is a emerging technology which is offering solution to a variety of application areas such as military, healthcare and industry. Sensors of WSN nodes are building blocks of WSN. Sensors usually used for target tracking, system control, environmental monitoring and biological detection. Many energy efficient routing algorithms and protocols have been proposed to enhance the network lifetime for WSN and gather the correct information..

Traffic characterizes patterns in wireless sensor networks WSNs usually follow a many-to-one pattern. Sensor nodes close to static sinks will deplete their limited energy more rapidly than other sensors, since they will have more data to communicate during multihop transmission. This will cause network partition, isolated nodes and much shortened network lifetime. Thus, important research issue is how to balance energy consumption for sensor nodes. In current years, exploiting sink mobility technology in WSNs has attracted much research attention because it can not only improve energy efficiency of WSN, but prolong network lifetime of WSN.

The maximum information that can be extracted for a fixed amount of energy increases and that the minimum energy required to output a fixed amount of information decreases which is actually expected. These functions are studied and presented for WSN which is concerned by the mobility of multiple sinks, a new approach where in mobile sinks are involved in WSN and energy hole problem is resolved.

2. LITERATURE REVIEW:

Energy efficient routing protocols has been always a good research area in WSN but the mobility factor is not considered in an appropriate level as it is evident that majority of the routing protocols assumes the nodes to be static. But it is observed that, in most of the applications where wireless sensor networks are involved like medical health care of patient or any disaster applications. The nodes can be mobile. So mobility of the nodes i.e. either the sink or the source has to be considered. Taking the advantage of sink mobility, we can significantly reduce the energy spent in relaying traffic and thus greatly enhance the lifetime of the network. This motivates researchers for developing an energy efficient routing algorithm which is supported by the mobility of multiple sinks in various applications.

3. METHODOLOGY:

3.1 PERFORMANCE METRIC

The important performance metric for Development of Energy Efficient routing algorithm for mobility of multiple sink is *Throughput*, *Efficiency*, *Delay* These values can be computed as given below.

- 1) Average output traffic $N_a(\text{out})$, or throughput (T_h) of a queue $T_h = N_a(\text{out}) = \text{output data rate packets/time}$ step is the units of T_h in the above expression.
- 2) Efficiency (η) or Access Probability (p_a) We define the access probability (p_a) or efficiency η as the ratio of the average output traffic relative to the average input traffic:
 $p_a = \eta = N_a(\text{out})/N_a(\text{in})$ This can be expressed in terms of the throughput
 $p_a = \eta = N_a(\text{out})/N_a(\text{in}) = T_h/N_a(\text{in}) \leq 1$

- 3) Delay: $d_{\text{end-end}} = N[d_{\text{trans}} + d_{\text{prop}} + d_{\text{proc}} + d_{\text{queue}}]$

where

$d_{\text{end-end}}$ = End-to-End delay

d_{trans} = Transmission delay

d_{prop} = Propagation delay

d_{proc} = Processing delay

d_{queue} = Queuing delay

N = number of links (Number of routers + 1)

Transmission delay: $D_T = N/R$ in seconds

where

D_T The transmission delay in seconds

N The number of bits, and

R The rate of transmission (say in bits per second)

3.2 EVALUATION CRITERIA

- The network is composed of " N " sensor nodes, denoted as: $\{S_1, S_2, S_3, S_4 \dots S_N\}$ uniformly dispersed within a circular field with a radius of R and continuously monitor their surrounding environment parameters.
- First we deploy one mobile sink BS at the edge of the proposed circle. The sink rotates clockwise with certain velocity along the arc of the circle.
- Its track is fixed and the movement is predictable.

Assumptions:

- All nodes are similar and remains stationary after deployment.
- The sink node is shifted at the edge of the sensing field.
- Nodes can modify their transmission power according to the relative distance to receiver
- All links are symmetric. [11]
-

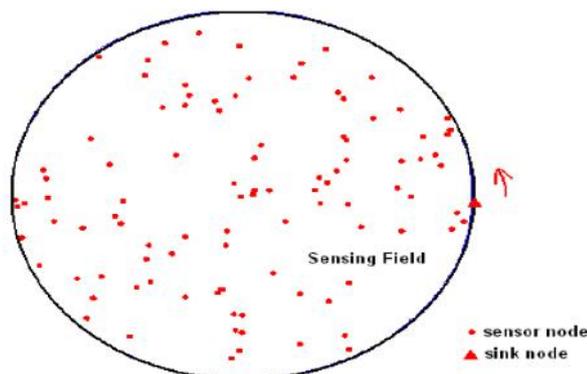


Figure 1 Network model

- Here we consider the energy model based on the distance between transmitter and receiver, a free space (d^2 power loss) or multi-path fading (d^4 power loss) channel models.
- Energy to transmit a l -bits packet over distance d by each node is given by:

$$E_{Tx}(l, d) = \begin{cases} lE_{elec} + l\epsilon_{fs}d^2, & d < d_0 \\ lE_{elec} + l\epsilon_{mp}d^4, & d \geq d_0 \end{cases} \quad (1)$$

Where E_{elec} is the dissipated energy per bit to run the transmitter or receiver circuit, ϵ_{fs} and ϵ_{mp} represent the transmitter amplifier's efficiency and channel conditions (Channel parameters in free space model and in multi path model)

To receive a transmitted packet, radio consumes energy:

$$E_{Rx}(l) = lE_{elec} \quad (2)$$

Relocation of The Sink [11]

1. In proposed algorithm, the moving direction (counterclockwise or clockwise) and velocity v of the sink are already calculated and defined in prior .
2. Therefore the sink needs to broadcast across the network to communicate all sensor nodes of its current location P_0 at the start for just one time.
3. After that, as sensor nodes keep record of the original location of the sink, they can reduce the changed angle after a time interval Δt :

$$v = \frac{\theta^* R}{\Delta t} \Rightarrow \theta = \frac{v^* \Delta t}{R} \quad (3)$$

As P_0 is known to all, the new location $P_{\Delta t}$ can be calculated.

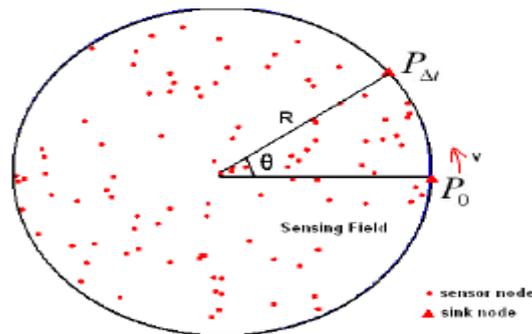


Figure 2 Relocation of the sink

Member node S_i in one cluster, the energy consumption it costs to inform data directly to its cluster head CH S_i is represented as $E_1(S_i, CH S_i)$ [11]

$$E_1(S_i, CH S_i) = \begin{cases} lE_{elec} + l\epsilon_{fs}d(S_i, CH S_i)^2, & d(S_i, CH S_i) < d_0 \\ lE_{elec} + l\epsilon_{mp}d(S_i, CH S_i)^4, & d(S_i, CH S_i) \geq d_0 \end{cases} \quad (4)$$

To deliver a l -length packet to the cluster head, the energy consumed by S_i and S_j is calculated as

$$\begin{aligned} E_2(S_i, S_j, CH S_i) &= E_{Tx}(l, d(S_i, S_j)) + E_{Rx}(l) + E_{Tx}(l, d(S_j, CH S_i)) \\ &= l(E_{elec} + \epsilon d^\alpha(S_i, S_j)) + lE_{elec} + l(E_{elec} + \epsilon d^\alpha(S_j, CH S_i)) \\ &= 3lE_{elec} + \epsilon d^\alpha(S_i, S_j) + \epsilon d^\alpha(S_j, CH S_i) \end{aligned} \quad (5)$$

Where ϵ and α changes in different conditions according to the energy model.

Selection Criteria Of Cluster Head

1. When the time of selection starts, we first promote the sensor node that is located in the center of each cluster like S_i
2. If any node $S_j > S_i$, it becomes the new cluster
3. If residual energy of $S_j < S_i$, it still broadcasts the message of S_i
4. If residual energy of $S_j = S_i$, compare the different IDs. The node with a small ID will wins.

5. As soon as the comparison is done, the remaining nodes which are un-chosen node becomes idle once again. All nodes in the cluster should be compared only once. In this way, the cluster head is selected on the basis of the largest residual energy.

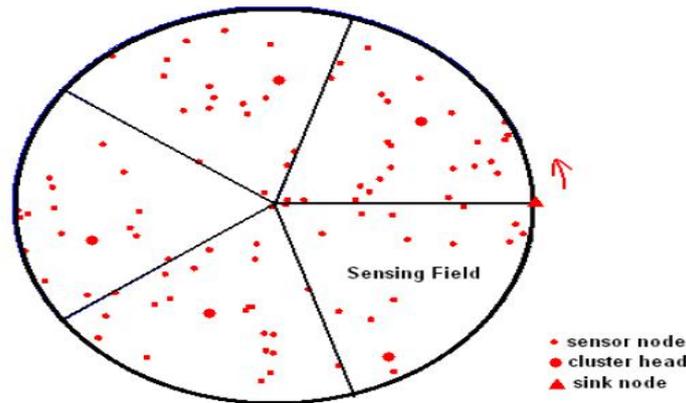


Figure 3 Cluster formation

Proposed routing algorithm has various advantages

- Traffic load reduces data aggregation.
- The cluster heads deployment is in a more uniform way as compared deployment in LEACH.
- Proposed algorithm is more suitable for large scale deployed WSNs.
- It can prolong the network lifetime. by keeping the majority of nodes close to the communication module,

3.3 EVALUATION METRICS:

Simulation is conducted on NS2 simulation tool of an area 1500m x 1500m, Number of nodes used is 50. Out of which 6 Nodes makes one sink site, and here construct backbone nodes and multiple sink node in each cluster.

Below table show the parameters used.

SL No	Parameters	Values
1	Number of Nodes	50
2	Topology Dimension	1500x1500
3	Traffic Type	CBR
4	Radio Propagation Model	TwoRayGround
5	MAC Type	802.11
6	Packet Size	512
7	Antenna Type	Omni
8	Mobility Speed	250
9	Routing Protocol	AODV

3.4 SIMULATION RESULTS:

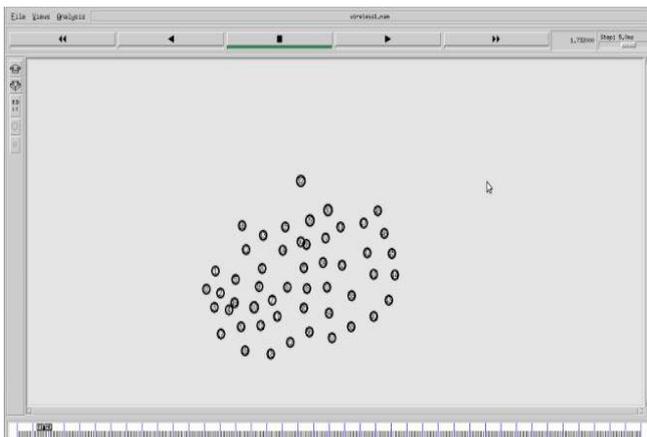


Fig1. Shows the sensor nodes deployed.

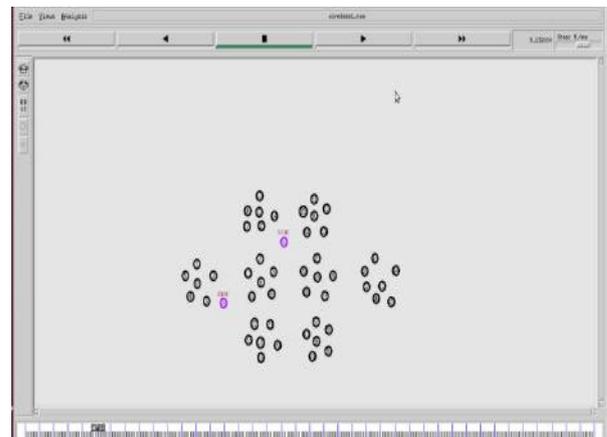


Fig 2. Sink sites are created

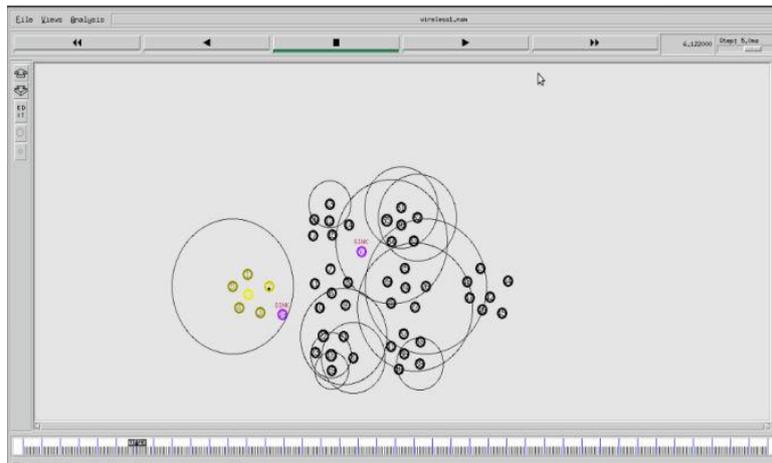


Fig 3. Data transmission to the sink node.

4.CONCLUSION:

The main issue of energy hole problem is resolved by Mobile-sink deployment. The present study propose a Energy-efficient Clustering Algorithm with sink mobility for WSN. The mobile sink shift their position around the edge of the proposed square sensing field. Clustering technique routing algorithm with multiple clusters with multi-hop ensures less energy utilization.

The present study mainly concentrates on studying the performance evolution of both multiplicity and sink mobility. Present simulation results ensures that the energy consumption of our Mobile-sink based Energy-efficient Clustering Algorithm is largely reduced and life time of WSN is increases.

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Food Price Crises Understanding Based on Indian Tweets Data Analysis

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1. INTRODUCTION:

In India, Food prices have a direct effect on the purchasing power of a large part of the Indian population, and increases pose a threat to household food security, particularly when inflation affects the price of staple foods such as rice or other sprouts. Particularly for poor households, food accounts for almost 75 percent of total spending. Government's occasional efforts to reduce fuel subsidies have been known to drive up food prices. It is the government's concern to respond to these shocks and try to mitigate their negative impact, as early as possible. The use of social media is widespread in India; the country has the largest Facebook population in the world, and largest number of Twitter users worldwide.

Traditional statistics, household surveys and census data have been effective in tracking medium to long-term development trends, but are less effective in generating a real-time snapshot in order for policymakers to develop timely actions to protect vulnerable populations against crises. In [2], it is noted in the report section entitled 'wanted: A Data Revolution', better data and statistics will help governments to track progress and ensure their decisions are evidence-based. The High Level Panel's call for a data revolution acknowledges that today there is an ocean of data—generated by citizens in both developed and developing countries—that did not exist even a few years ago. This data is passively generated by people simply by living their daily lives. Mobile phones, social media and Internet searches all leave digital traces that, when anonymized, aggregated and analyzed, can reveal significant insights that help governments make faster and more informed decisions. One of the major sources of such real- data is today's social media networks like Facebook, Twitters. In India, one of such real data source is Twitter. The user count is increasing exponentially on Twitter day by day.

This wealth of data presents an opportunity to extract real-time insights about publicly shared interests and issues pertinent to the Indian population.

In India, populations have been particularly exposed to food price increases since last 7-8 years: the Food Price Index has been growing at a higher rate than the overall Consumer Price Index (CPI). This inflation is compounded by the price of staple crops and sprouts, which has a direct link to Indian households' food security and rose in higher percentage. Therefore, this research project will analyze the volume of Twitter conversations about food and fuel price increases and will try to infer real-time information regarding how price increases are perceived by the Indian population. It will present the context, methods and results of the research based on big data analytics. The detailed taxonomy will be developed and will be used to monitor and categorize the conversation about food prices in India and the subsequent quantitative analysis.

2. REVIEW OF RESEARCH AND DEVELOPMENT IN THE SUBJECT:

The rise of social media has been accompanied by a plethora of research on the techniques of mining social media to detect opinions, trends and consumer patterns. Salathe et. al recently completed research mining Twitter data for anti-vaccination sentiment, in an effort to understand how negative sentiment can spread via online communities [1]. UNICEF published a paper in April 2013 on anti-vaccine sentiment on social media across Eastern European, including Facebook, Twitter, forums and blogs[2]. It aimed to monitor specific concerns related to vaccines, identify influencers in online communities and develop strategies to counter anti-vaccination campaigns. Several researchers have mined Twitter and other social media for opinions on movies and so box office revenue [3] and to predict future stock price behaviour [4]. Certain topics are better suited to social media analysis than others. Asur and Huberman list the conditions for a topic to be a good candidate for analysis in their paper studying Twitter's predictive value for box-office revenues [5]. Namely, the topic has to be widely discussed on Twitter (or in some social media outlet) and real-world outcomes have to be easily verifiable. In detecting opinions Pang and Lee discuss steps in identifying texts (in this context a 'text' represents any human generated linguistic content such as a tweet or a blog entry) that are of interest [6]. First, relevant texts can be filtered based on topic, followed by an assessment of whether the texts are

objective or subjective, after which their polarity (i.e. whether a text is negative, neutral or positive) can be assessed and finally the intensity of their opinion.

There are two broad approaches to automated sentiment analysis of texts; unsupervised learning approaches and supervised learning approaches. In its simplest form, the former approach uses sets of single words with known positive and negative meanings such as

Positive: 'great', 'good', 'improvement', 'happy'

Negative: 'terrible', 'poor', 'sad', 'tragic'

The number of words in each text with positive meaning is then compared to the number of words with a negative meaning to give an overall sentiment score. Such an approach, however, struggles to correctly classify 'not great' as having negative sentiment since it simply sees 'great' in the list of positive words and infers positive sentiment. Other subtleties include slang meanings of words that have an alternative sentiment compared to their formal use. Hence the algorithm, when training the machine, should take the context of their use. In Indonesia there are 300 local dialects so analysis should avoid examining terms in isolation but must also look at the context of their use. More broadly, while well-established collections or 'corpora' of words with known positive or negative sentiment exist in English and other major languages (e.g. Linguistic Inquiry and Word Count [7]) these are much less developed in other languages of interest for development work. Supervised learning, on the other hand, requires human classification of example texts as positive or negative. Computer algorithms then 'learn' how to determine if a new text is positive or negative from these examples. While supervised learning requires some human effort in training the algorithm unlike its unsupervised counterpart, the analysis has the advantage of being generally more context specific and therefore more accurate.

In evaluating polarity, Pang and Lee discuss features to search for, including keywords that indicate emotion, position of key words and parts of speech [8]. Joshi et al. discuss the use of n-grams (a string of n words) that are topic specific or indicate emotion in their work on detecting opinions on movies via text mining [9]. Pang, Lee and Vaithyanathan attempt a more statistical approach to sentiment classification, using models to quantify the probability of a text's polarity given the presence of various features [10]. Current research discussed above, supports the notion that Twitter can be used to analyze public Sentiment on food prices in real time. Food price fluctuations are widely discussed and the effects are easily observable (e.g. protests). Furthermore there is a large and growing body of research on techniques to categorize relevant tweets and/or use supervised training methods to automatically mine social media texts.

3. METHOD:

3.1 Importance of the proposed project in the context of current status

The research proposed here will be a proof-of-concept demonstration that semi-automated sentiment analysis of social media streams can demonstrate significant correlation with official, ground truth statistics. The potential of such techniques can be verified, further work is necessary both to improve the accuracy of the category classification, analysis of food prices from Twitter conversation, and also to refine the technique to provide more fine-grained analysis. The development of proposed system can be used for strengthening of early warning systems and predictive models. Somewhat ironically, more fine-grained official statistics would be necessary to conduct a more detailed calibration and this project is intended for the same research work with detailed analysis of Twitter data in context of Big Data. However, due to the increasing popularity of Twitter, it is likely that over the studied period of several years that this baseline rate is increasing. That is to say, with more tweets on all topics over time, we will observe more tweets on food price increases over time and this trend should be accounted for betterment in lifestyles of poor households in India with effective Government Decisions based on such data analytics.

3.2 Objectives

Mainly, this methodology will attempt to provide answers to the following questions as part of proposed system

- ¹ Are people talking about food price increases on Twitter? If so, how?
- ² How does this information compare with ground truth information?
- ³ Are people also talking about fuel price increases on Twitter? If so, how does it relate to the Twitter conversations about food prices rising?

3.3 System Model

The proposed system to aim this is shown in figure 1 and details of each of this component is illustrated in subsequent section.

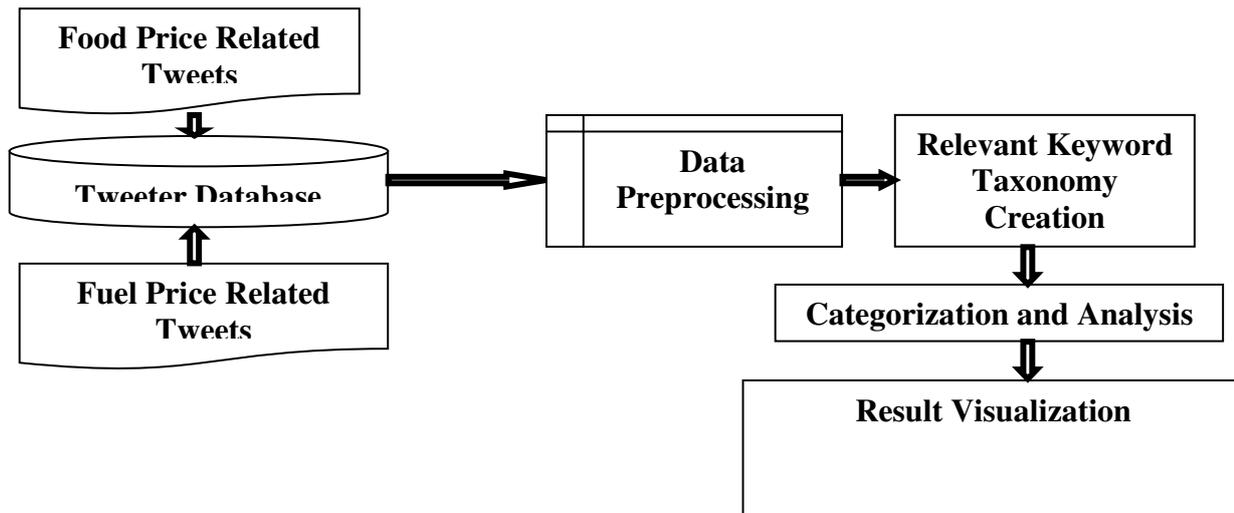


Figure 1. Proposed System Model

Defining Data Set:

The general tools used for data collection, categorization and analysis are called monitors. The following steps outline the process of setting up, running, and using the monitors.

The dataset will be used in this study includes all publicly available tweets coming from the Twitter for the period of at least two-three months. Even, the massive growth in Twitter use over this period will be reflected in an increasing volume of tweets over time in each of the used monitors.

Data will be collected for two kinds of Tweets

- Food Price Increase Related Tweets
- Fuel Price Increase Related Tweets (As people believe in Fuel price hike brings price increase in Food and other commodities too)

Data Preprocessing:

While the metadata for users coming from the Twitter provides language and some location tagging, it still requires further filtering. For example, a bilingual user might set the default language for his/her account as Hindi but frequently tweet in English adding noise to the analysis. Therefore we further need to filter such tweets to isolate those in the Hindi language for further best results of the system execution. The details of training data, testing will be modeled and attack details will be elaborated.

Relevant Keyword Taxonomy Creation:

To determine content that might be relevant to the subject of analysis, a broad keyword filter will be used to identify which tweets are on topic. The condition for relevance based on keywords will be outlined to get relevant tweets for effective analysis.

Categorization and Analysis:

Before analysis, relevant categories will be defined by a domain expert. Based on the manual classification of some sample data ("training"), an algorithm will be then used to analyze the proportions of data that fall into the pre-defined categories like positive, negative, confused or wondering, etc. . The classification process therefore involves both manual and automated processes. The first step will be for a researcher to manually classify randomly selected posts. Posts that are not clear or can fit into more than one category are skipped during training. When each category has sufficient training posts the monitor will be run and the algorithm will automatically classify each further tweet collected by the monitor. Evaluation Test Bed for proposed system will be selected and evaluation parameters for proposed research work will be described and finalized. Actual performance evaluation will be carried out and final results along with their visualizations will be reported.

4. USEFULNESS:

An alternative mechanism to analyze food price changes is based on directly extracted numerical price values mentioned in human generated content such as "I just paid Rs.40 for a loaf of bread! What's going on". Another key aspect of food security is found as an identification of coping strategies - substituting expensive items with cheaper alternatives. While both of these techniques require more sophisticated textual analysis, there is the clear advantage of a more direct means of evaluating the food stress within households. Hence, there is the potential for a real-time map of food prices and food stress, which would be invaluable for policymakers.

So, following outcomes are expected from this proposed system

- To uncover the potential of Social Network Data Analysis
- Building these capabilities inside governments and the public sector will require specific training programs to selected public service officials.
- If this kind of analysis becomes robust and mature in the near future, statistical institutes might consider including social media monitoring into official statistics channels.
- To provide valuable information for policymakers based on accurate user opinion analysis.
- To carry out workshops to aware potentials of sentiment analysis.

5. CONCLUSION:

Due to growth of internet and data contents on Web, discovering opinion sites and observing them on the Web is very demanding and serious assignment in light of the fact that the sentiment or opinion substance are available on different sites, and each one site might likewise have an immense volume of opinionated text. So, handing of large amount of data can slower down the computing tools.

In numerous cases, feelings are not directly expressed and are covered up in long gathering posts and online blog. So it gets to be troublesome for a human reader to discover related sites, extraction of related contents with the opinions, examine them, outline them, and arrange them into perfect well-matched and usable structures. Along these lines, to do all these tasks there is need of automated opinion discovery and summarization system. Opinion mining experiences a few diverse difficulties, for example, recognizing which fragment of content is opinionated, recognizing the opinion holder, deciding the positive or negative quality of sentiment. Opinion mining is concerned with the human reviews, audits, feelings and wistful dialog. Each one has their particular observation and concern around a specific issue, topic or theme. Opinionated content may be forged, superfluous as well as equivocal data. Therefore, in proposed system use of high computing techniques based on data mining or big data are suggested for large data handling as well as use of natural language processing tools and standard tweeter data is expected for accurate mining of food crisis related issues.

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Food Security Assessment using Big Data Analytic

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1. INTRODUCTION:

Targeted action to eradicate hunger, food insecurity and malnutrition is only possible if actors understand why people are deprived. Such understanding requires the availability of reliable data, statistics and information, adequate capacity to analyze the available information and good communication skills to inform decision-makers. As many actors hold information about the food and nutrition security situation of a country, a common framework is needed to ensure coherence. Furthermore, a broad variety of methods and tools for food security and nutrition monitoring and analysis should be better harmonized for greater efficiency. The scope of a common and harmonized framework of information for food and nutrition security encompasses the following aspects:

- Ensuring that high quality data, statistics and information are available and easily accessible across sectors for monitoring and analysis of the food security and nutrition situation.
- Ensuring that available food and nutrition security data, statistics and information are well-analyzed and meet the needs of a variety of decision-makers in a timely and credible manner for policy formulation and investment decisions aimed at hunger eradication.
- Strengthening institutional structures for easy exchange and coordination of information for consensus building and harmonized approaches.

Food and nutrition security are development outcomes, resulting from the overall performance of economy and the action of individuals in many sectors: agriculture, forestry, fisheries, health, social development and others, all of which can contribute in multiple ways towards greater food and nutrition security. These interactions must be better understood by leaders, decision-makers and other stakeholders. However, experience shows that many decisions are not based on solid data or on sound analysis of existing evidence. Too often, leaders are confronted with partial information, or somehow contrasting evidence regarding food security and nutrition situations. In order to answer these issues of food security it is required to introduce advancements in computing technologies which can make new platforms and large volumes of data available to businesses and governments to discover hidden underlying patterns in the data and creating new knowledge. While businesses need to embrace these technologies in order to stay ahead of competition, governments can reap great benefits in cost effectively delivering social services and bring about improvement in social development indices. Exploitation of Big Data platforms and technologies requires both corporate strategies and government policies to be in place much before the results would start pouring in. Additionally, the public sector is a ripe area for applying the tools and techniques of Big Data to increase the efficiencies in the sector. This can happen in two ways: by using Big Data to improve programmatic outcomes, and to improve decision making. In this research work, we will investigate the potential of available Big Data platforms and technologies, their current use by various Governments, and their potential for use by the central and state Governments in India in case of Food Security.

2. REVIEW OF RESEARCH AND DEVELOPMENT IN THE SUBJECT:

2.1 International Status: It has been observed that, almost all decision makers are now investing and looking forward for information and potential gain of Big Data Analytics in their respective application domains. The following section highlights few major steps taken by developed countries to bring big data analytics into their advancements in well-human being [2], [4].

United States of America: In September 1993, the 'Information Highway' program was launched in USA. Similarly, in March 2012 the 'Big Data Research and Development Initiative' was launched. The project envisions improving and facilitating use of Big Data by extracting valuable information insights for better development. It primarily focuses on

healthcare, emergency response and disaster recovery, cyber security, education and employability, transportation and energy sector[4].

United Kingdom: COSMOS (see *what is COSMOS?*) aims to be an open platform for social data analysis that can harvest, archive, analyze and visualize social media streams. In due course, the platform is expected to link to other social data and is currently linked to the UK Police API, harvesting crime statistics. Collectively, the European Union has also started partnering through the program 'Horizon 2020' [7].

Japan: Aspires to be the World's Most Advanced IT Nation by year 2020. 'The Integrated ICT Strategy for 2020' has already been launched with a mission to develop Japan as a leader of Information Technology with Big Data at its center stage. The aforesaid IT strategy focuses at implanting the highest level of standards in Big Data technology and IT infrastructure [1].

Germany: The German Government has announced a Big Data research initiative namely 'production intelligence'. The aim is to perform real time analytics on all manufacturing data. This Big Data analysis will help to evaluate, improve, and enhance the manufacturing capacities and processes, to automate, and in effective decision making, and to achieve optimal manufacturing scenarios [5].

Australia: The Australian Public Service ICT Strategy 2012-2015 aims to use Big Data for better service delivery, efficient and effective mechanisms for e-governance, preserve national information assets, and improve health service offerings and better emergency response mechanisms. Australian government uses Patient Admission Prediction Tool (PAPT) (in collaboration with Australian e-Health Research Centre Queensland Health, Griffith University and Queensland University of Technology) software for Big Data analytics in health industry. PAPT aims to achieve predictions for number of patients that hospital may expect in the near days, emergency cases, hospital staff's case(s) handling capacities, available and required labor pool as and when need arises, and balanced workload. These predictions can achieve timely service delivery, better disaster resilience and a far better quality care offering.

United Nations: UN recently launched a project 'Global Pulse: Harnessing Big Data for Development and Humanitarian Action'. Global Pulse is intended to ascertain and predict the societal issues like unemployment, disease outbreaks, and likewise. It aspires to achieve proactive approach in handling alarming events arising out of humanitarian grounds. It works for creating awareness and development in regard to Big Data opportunities and its value addition for society (<http://www.unglobalpulse.org/>).

2.2 National Status: Substantial Big Data is being generated (and stored) by Government departments in India already. Department of Science and Technology, GoI has announced plans to take Big Data research forward in the Indian context. However, continuous effort shall be needed for a long period of time before some success stories of big data studies and their results are visible. More efforts to tap the potential of big data analytics, especially in the social welfare sphere, are needed. The bottlenecks needed to be overcome are: (i) not much (big) data is being collected and stored in India (leaving a few segments, such as, scientific community with space and weather data), (ii) accessibility to expensive platforms (hardware and software needed, though open source can be deployed) is limited, (iii) efforts are needed in the direction of preparing policies and legal frameworks covering issues such as responsibility for collection, storage, and preservation, protection from illegal use, ownership of the data and (extent of) freedom to share with others, etc.

Prime Minister's farmer soil health card is an initiative which could provide extremely valuable data in future contributing to the nation's food security. Similar schemes are also needed for our other national natural resources to provide scope for exploiting big data applications for big gains.

The central and state Governments in India stand to gain a lot by joint planning, collection, sharing, and analysis of big data to develop appropriate talent development plans for future, planned farming to avoid over and under production in a season leading to excess or shortage, and similar other schemes. Effort is needed to tap the potential in big data starting with: to identify, support (such as through fully funded academic scholarships), develop, and employ special talent to tap the potential of big data [6].

3. METHOD:

3.1 Importance of the proposed project in the context of current status

The world is changing: earlier understanding of the historical chain of events was viewed as knowledge but now its meaning has turned into being a capability to predict and influence the future, including the ability to diminish negative future outcomes and enhance positive ones. In one of its emerging forms, this science is known as Big Data. The following section depicts the facts behind emergency of use of such computing technologies in food security issues of India.

A review of the global context in respect of food security points out that the slowing down of the growth rate of food production has led to a decline in per capita output of grain between the 1970s and the first decade of the twenty-first century, due in most part to the reduced ability/willingness of governments to raise and spend the required

amount of resources by way of public investment on rural and agricultural development. This is equally apparent in the areas of urban infrastructure and public health, given the policy framework of far greater reliance on markets and private investments, and a much lesser role for governments. The result has been difficulties in tackling problems relating to all three dimensions of food security, namely, availability, access and absorption, especially affecting the world's poor, including the urban poor.

The Indian context – in particular, the urban situation – is no different. Rising urban inequality, significant underinvestment in urban health and nutrition infrastructure, an increasingly insecure workforce with mostly casual or contract employment or even less remunerative self-employment, growth of slums and slum populations lacking in the most elementary health and hygiene facilities including shelter, safe drinking water, sanitation and drainage, all taken together, make for a situation of a permanent food and nutrition emergency in urban India. The mere availability of food in urban markets does not guarantee food security in an environment in which access has been seriously compromised both by patterns of employment and earnings, and by the rapid rise in the prices of essential commodities beginning with food and shelter.

Therefore, to support scope of a common and harmonized framework of information for food and nutrition security, big data analytics would help

- To ensure that high quality data, statistics and information are available and easily accessible across sectors for monitoring and analysis of the food security and nutrition situation.
- To make availability of food and nutrition security data, statistics and information are well-analyzed and meet the needs of a variety of decision-makers in a timely and credible manner for policy formulation and investment decisions aimed at hunger eradication.
- To strengthen institutional structures for easy exchange and coordination of information for various organizations to harmonize this framework.

3.2 Opportunities of Big Data Analytics:

Big Data being voluminous allows us to explore new information avenues with better granularity and without the risk of blurriness. Immense volumes of data lie around us needing to be collected and processed to extract value. One of the major benefits of creating and using Big Data is that it highlights and spots such points of concern which otherwise may be entirely undetectable when using sample data [5].

Governments and PSUs: Governments are increasingly adopting digital technologies. USA.gov and 'Digital India' are notable examples of this trend. The 2012 presidential election campaign in U.S has seen one of the remarkable uses of Big Data for better decision making. President Barack Obama's campaign team conducted Big Data analysis to target voters and identify the most responsive regions for campaigning and then allocating the resources to the destined areas. The winning of Obama and his getting re-elected as president of U.S.A demonstrated and unfolded a new strategic step in making sense of Big Data [4].

4. OBJECTIVES:

Mainly, proposed work will attempt to provide answers to the following questions as part of proposed system development:

- What is the Food Security data? Where is this data? Who owns it? Who has access to it?
- Is it technically, legally, ethically, politically feasible to run analytics on it? What does it cost to analyze this data?
- What are the expected benefits of this analysis? Do the benefits outweigh the costs?

In this research work, we will mainly collect data for analysis from various means like internet, social blogs and sites as well as through news media wherein comments, expressions given by household consumers, analysts and experts.

Data Collection: To this aim, data can be produced on the – not exhaustive – following aspects:

- individual or household food consumption data;
- food production, supply and trade data;
- food price data and analysis;
- food access data based on individuals' experience.

Data Preprocessing: Big Data is perceived as comprising structured, unstructured and semi-structured data. Among them the unstructured data lead, with an estimated share of over 95% in Big Data. Structured data are those that are systematically stored for retrieval, manipulation and analysis, for example, as in relational databases. Semi-structured data do not reside in relational databases but have some organizational properties making them easier to analyze. With a few alterations semi-structured data can often be reorganized in relational databases. XML is an example of semi-structured data. Unstructured data, on the other hand, do not follow any specified format and are largely void of meta-data, such as data from social media, emails, videos, photos and audio files data. So, to get better data for further decision making process of this system, the role of data collection and its preprocessing is required to help governments design better policies and programmes and implement them more effectively.

Information Dissemination Framework Construction for Food Security : Malnutrition is widely viewed as one of the most pressing global challenges. This political commitment is expressed in global initiatives (Scaling-up Nutrition, Global Compact on Nutrition) and financial pledges made. All these initiatives need to be guided by food and nutrition security data and analysis. The Figure 1 depicts the broad stages in proposed Food Security Framework construction.

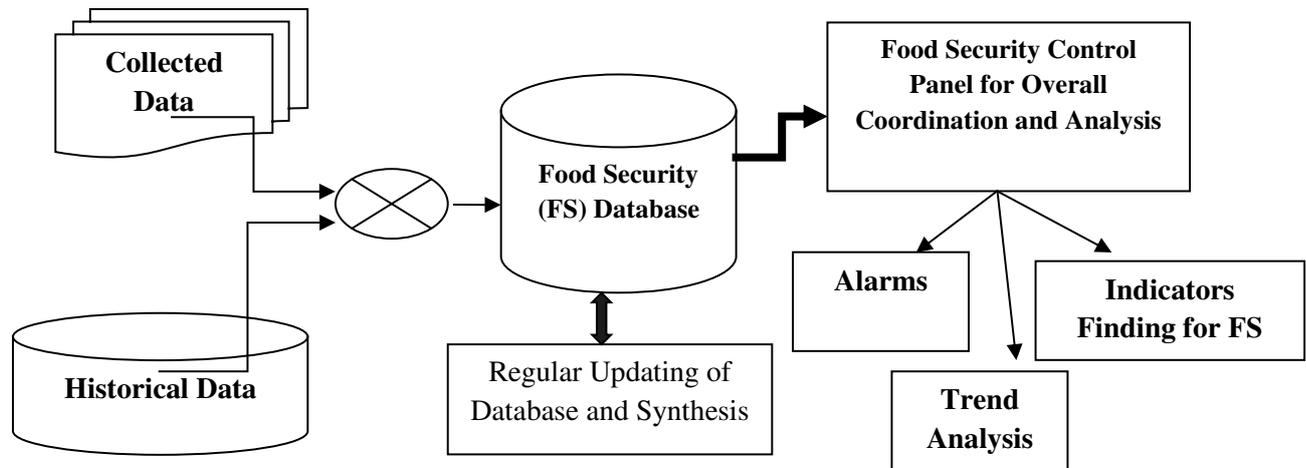


Figure 1 : Flow of Execution of Proposed Food Security System Construction

Food Security Control Panel and Coordination

All actors in a country hold information about the food and nutrition security situation. Their combined knowledge is greater than the sum of its parts.

Evidence-based decision-making comprises of Generation of Alarms, Trend Analysis and Food Security Indicators Finding

Solid analysis, broad stakeholder involvement, clear technical standards and methods are necessary supporting instruments to enable sound decision-making. Evidence-based decision-making strengthens the four dimensions that constitute the enabling environment for a more rapid reduction in hunger: In order to improve decision-making by providing sound evidence as a basis, three concrete main areas of interventions are involved: 1. Strengthening the capacity of food security and nutrition analysts. 2. Promoting food security and nutrition information systems that encourage coordinated data storage, dissemination and analysis at the service of decision-makers. 3. Communicating the results of complex analyses in timely and user-friendly ways.

5. USEFULNESS :

As per the review, it has been observed that extensive theoretical review and research work has been carried out on food and nutrition security by UNICEF and other research agencies, universities and institutes too. But, it is apparently seen, the use of new emerging trends of computer technology in their work. So, the main target of this project is to apply the potential of big data into such area where there is actually need of computer techniques to resolve human being life problem. The following section highlights the usage of this proposed work in future.

- It will open new field for computer technology researchers to unfold the problems related to agriculture in India.
- To uncover the use of big data analytics to solve the concerns of food safety.
- To bring technology into agriculture field to simplify Farming and Farmers life style.
- To train more computer professional, faculties and agriculture supporting staffs on big data analytics with training sessions on such big data systems.
- To carry out workshops to prepare pool of talent on big data analytics which is today's demand.

6. CONCLUSION:

In order to guarantee food security over time, the *structural risks of food insecurity must be clarified* (urban poverty, areas lacking water, etc.), as must the *economic risks* (drought, floods, over-production, devaluation, etc.) and their *probability*. *The principal constraints to guaranteeing a dietary minimum to everyone at all times* should also be clarified: geo-climatic constraints leading to total or partial isolation (in time and space), other constraints of a social, economic, political or religious nature. In this area particular attention must be paid to phenomena having a direct impact on individual diets: for example, rural exodus and urbanization that leads to *changes in dietary habits*, or the health problems that affect *the assimilation of food*. On other hand there are challenges from the big data point of view. From the foregoing, we note that *big data* can be used to analyze, formulate and monitor public policy in myriad ways. However, its use continues to be fraught with many challenges, chiefly related to *privacy, discrimination and*

liability However, in proposed system, research will be carried out with proper ethical, technical standards use and techno-legal perspectives to preserve privacy, integrity and liability of collected big data for food security. Also, it will ensure food security relief through proposed framework as given in Figure 1 with effective evidence-based decision making process.

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Image Mosaicking using Harris Corner Detection

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Abstract: Image mosaicking is the handle in which distinctive photographic pictures are coordinates together to frame a portioned scene or a tall determination picture. Different pictures are covered and mixed to shape a wide point all-encompassing picture. The whole picture sewing handle is done by pictures taken from a camera and at that point applying the handle on a computer program. The primary steps incorporate picture securing picture enlistment picture mixing. The picture enrollment handle utilized in this strategy is a highlight based strategy which employments HARRIS corner detection calculation for include discovery, the picture sewing calculation is at that point prepared to donate a sewed all-encompassing picture.

Keyword: Image Mosaicking, Scene, Harris Corner, Feature detection, feature matching.

1. INTRODUCTION:

In today's computerized world there has been an exponential development in all-encompassing picture era. Panorama is a Greek word which means "all sight" [8]. A broad view representation of any space is Panorama. Image mosaicking is fundamentally combining two or more diverse pictures to shape one single picture that is scene. We can increase the field of view by using image stitching; people utilized image mosaicking technique in topographic mapping. All-encompassing picture generation is being broadly utilized in canvases, photography, seismic pictures and also in film industries. For craved all-encompassing era numerous sequential previews covering the entire zone is required.

Normally, a camera is able to take pictures in the range of its sight; it cannot take an expansive picture with all the points of interest fitted in one single outline. All-encompassing imaging settle this issue by combining pictures taken from distinctive sources into a single picture. Picture sewing calculations make the tall determination photo mosaics utilized to deliver today's computerized maps and partisan photographs. Making tall determination pictures by combining littler pictures are well known since the starting of the photography. There ought to be about correct covers between pictures for sewing and common locale between pictures. The pictures of same scene will be of distinctive power, scale and introduction.

2. LITERATURE SURVEY:

Weiqing Yan, Chunping Hou, Jianjun Lei, Yuming Fang, Zhouye GU, and Nam Ling [1] is proposed a novel hybrid warping model for stereoscopic image stitching.

Jiayi Wang and Junzo Watada [2] introduces some methods of feature point detection and panoramic image mosaic using Open CV.

Mahesh and Subramanyam M .V. [3] proposes the image mosaicking algorithm based on feature detection technique.

Lei Yang, Xiaoyu Wu, Jun Zhai and Hui Liis [4] they sums up three algorithm first is Harris corner detection algorithm second SIFT (Scale Invariant Feature Transform) algorithm and third SURF (Speeded-Up Robust Features) algorithm all are based on the feature matching.

Li- Hui Zou, Jie Chen, Juan Zhang, Li-Hua DouIn [5] they compared two broadly used corner detection algorithms which are SUSAN and Harris corner.

R. B. Inampudi, in the paper [6] proposed a design a high performance software to perform geometrical and radio metrical corrections of two or more images without using any kind of special hardware. His work is on retina and kutub minar image.

CHEN Kaili and WANG Meiling [7] they analyzes Harris algorithm for image stitching which is based on OpenCV configuration environment.

Shreyas Mistry, Prof. Arpita Patel [8] they presented the fundamental and basic image stitching technique using Harris corner detection also discussed the general model of image stitching and the process associated with each of the step.

3. PROPOSED METHOD :

3.1 Image Stitching for Panorama

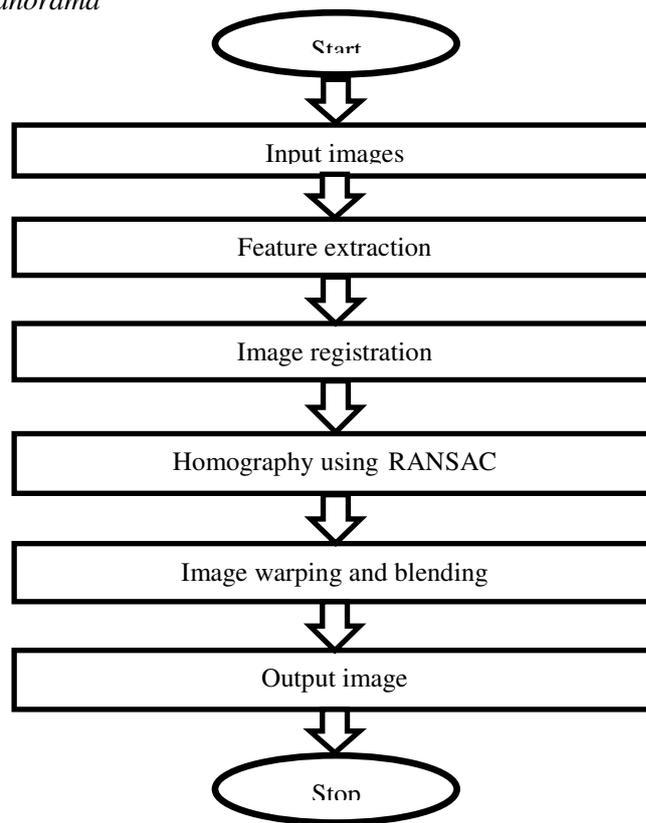


Figure 3.1: Image Stitching Algorithm

3.2 Feature Detection and Feature Extraction

The main part of image stitching is feature detection. In the image, feature points of the image are the components of that specific image. The fundamental idea to do feature detection is that, the image can't be seen as entirely an image but the particular points in the image can be taken independently and after that processed by applying feature detection strategies.

The most significant feature of corner is that if there is a corner in an image then its neighborhood will show an abrupt change in the intensity [8]. The local feature detectors depict a pixel in the image with its content. The Harris corner detector algorithm is very efficient and widely used. Harris corner detector is rotation invariant and has enough information for the feature matching process.

3.3 Harris Corner Detector

Harris is the combined corner and edge detector. The Harris corner detector is a popular feature point detector. In Harris corner detection algorithm calculate the each pixel's gradient. If the absolute gradient value changes significantly in all directions, then declare the pixel as a corner [3].

$$R = \det(M) - k (\text{trace}(M))^2 \dots\dots\dots 3.1$$

$$\text{Where } \det(m) = \lambda_1 \lambda_2$$

$$\text{Trace}(M) = \lambda_1 + \lambda_2$$

λ_1 and λ_2 are Eigen values of M

R is degree the corner response at each pixel co-ordinates (x, y).

The mathematical form of the Harris corner detector is as follows.

$$M = \sum_{xy} w(x,y) \begin{bmatrix} I_x I_x & I_x I_y \\ I_x I_y & I_y I_y \end{bmatrix} \dots\dots\dots 3.2$$

I_x, I_y represents the to begin with arrange gray slope of flat and vertical. From the above matrix in equation 4.2, it can be simple to find the norm intensity level change in the particular direction and the particular direction orthogonal to the old particular direction using the Eigen values. These are calculate from the matrix. These Eigen values can be used to find the location of the point which is the on the edge or in a corner.

The edge and the flat area of the image can be computed from the Eigen value as follows:

If one Eigen value is high and the other is low, the point is located on the edge line.

If both the values of the Eigen vector are having low intensity, then the point is located in the homogeneous region.
If both the values of the Eigen vector are high in the region, then the point is a corner. [8]

3.4 HOMOGRAPHY ESTIMATION USING RANSAC

It is mapping between two spaces which is often used to represent the correspondence between two images of the same scene. It is widely used for the project where multiple images are taken from a rotating camera center ultimately warped together to produce a panoramic view.

The Random Sampling Consensus (RANSAC) [3] is used to fit a model to the information set while classifying the information as inliers and outliers. This algorithm is used in figuring the fundamental matrix to correspond two images with broad or small baseline and assessing a homography. A set of inliers can be decided from an input information set of points. It proceeds as follows:

- Take N times from the information set arbitrarily. N is the number of trials required to accomplish a certainty level p , which is chosen around $0.9 \sim 0.99$
- Select 4 sets of test points and make sure that no three of them are on the same line. Compute H through the test points.
- Compute the space between the corresponded inliers after the H transformation.
- Compare the space with the threshold. In case it is less than the threshold, keep the points as inliers. Compute the H from the sub-data-set which contains the most inliers.

3.5 Image Warping

Image warping is the procedure in which image is digitally manipulated such that any shapes depicted in an image have been significantly deformed. Fundamentally we can just warp all input images to a plane specified by one of them which is known as reference image. Warping can moreover be utilized for rectifying image distortion as well as for imaginative intentions. This technique is equally applicable for video. By using the geometric transformation the two images will form the mosaic are warped. While an image can be transformed in different ways, the points are mapped to points without changing the colors is called pure warping. It can be based on mathematically any function from the plane to the plane. If the function is put in the original then it can be rebuilt.

Image warping is a transformation which maps all positions in one image plane to positions in a second plane [8]. The below list provide idea where image warping can be utilized.

- (1) Images can be distorted due to simulation of optical deviation.
- (2) Images may be seen as if they projected on the bent or reflected surface.
- (3) Images may be partitioned into polygons and each polygon is distorted.
- (4) Images may be aberrated utilizing morphing.

3.6 Image Blending

Blending is the last step is to mix the pixel colors in the coincided region to avoid the seams. The easy available form is to use the feathering, which utilizes weighted average color values to mix the overlapping pixels. Image blending technique adjust the image gray levels in the region of a boundary to get a smooth transition among images by removing these seams and making a mixed image by finding out how pixel in an overlapping field should be presented.

There are many different pixels blending methods used in image stitching, such as feathering image blending, gradient domain and Image Pyramid blending [9].

Mixing can be executed by utilizing a binary mask which overwrites the pixel values of one image to the pixel values of other image. As well mixing is handled by linearly uniting the pixels of one image with those of the next image.

4. CONCLUSION:

The image stitching has wide scope of application in different areas it is one of the most important research area in the image processing. Here we have represented the image stitching method utilizing Harris corner detector. This paper discussed the Harris corner detector and also RANSAC algorithm to expel the outliers from the images.

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SCMH : Cross Media Retrieval

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Abstract: Hashing methods are important and widely useful technique in recent years. They have proposed several approaches to capture the similarities between textual, visual, and cross-media information. In existing, use a bag-of-words is a technique of representing text data and also used in natural language processing and information retrieval. Because words with different forms can they have a similar meaning, semantic text similarities cannot be well elaborated in these methods.

In this paper, propose a new method called semantic cross media hashing (SCMH), which uses continuous representations of words by capturing the semantic textual similarity level. In proposed method, two commonly used cross media datasets (i.e. mrflicker and label me).

Keyword: Fisher vector, hashing method, SIFT descriptor, word embedding.

1. INTRODUCTION:

With the rapid expansion of the World Wide Web, information has become much easier to access, modify and duplicate. Therefore, the hash similarity based calculates or approximate search close by next they have been proposed and received a remarkable attention in last few years. Various applications such as information Retrieval, detect near duplicates and data mining.

They are executed with hash-based methods. Because of the fast the expansion of mobile networks and social networking sites, information entry through multiple channels has as well growing attention. Images and videos are associated with tags and captions. According to a research published in EMarketer, about 75 percent of the content aside Facebook photos users contain relevant data the different modes usually have semantic correlations. Therefore, it is desirable to support the retrieval of information using different modes. For example, images it can be used to find semantic relevant text information. On the other hand, images with no (or less) textual descriptions are very necessary to be recovered textual query.

2. REVIEW OF LITERATURE:

This paper[6] addresses the problem of large-scale image search. Three constraints have to be taken into account: search accuracy, efficiency, and memory usage. We first present and evaluate different ways of aggregating local image descriptors into a vector and show that the Fisher kernel achieves better performance than the reference bag-of-visual words approach for any given vector dimension. In this paper, we study the problems of learning hash functions in the context of multimodal data for cross-view similarity search. We put forward a novel hashing method, which is referred to Collective Matrix Factorization Hashing (CMFH). In this paper, we present a new multimedia retrieval paradigm to innovate large-scale search of heterogeneous multimedia data. It is able to return results of different media types from heterogeneous data sources, e.g., using a query image to retrieve relevant text documents or images from different data sources [4].

Y. Pan et al.[3] This paper demonstrate the above two fundamental challenges can be mitigated by jointly exploring the cross-view learning and the use of click-through data. The former aims to create a latent subspace with the ability in comparing information from the original incomparable views (i.e., textual and visual views), while the latter explores the largely available and freely accessible click-through data (i.e., crowdsourced human intelligence) for understanding query. This paper addresses the problem of learning similarity-preserving binary codes for efficient similarity search in large-scale image collections. We formulate this problem in terms of finding a rotation of zero-centered data so as to minimize the quantization error of mapping this data to the vertices of a zero-centered binary hypercube, and propose a simple and efficient alternating minimization algorithm to accomplish this task[2].

G. Ding et al.[7] proposed a novel Latent Semantic Sparse Hashing (LSSH) to perform cross-modal similarity search by employing Sparse Coding and Matrix Factorization. In particular, LSSH uses Sparse Coding to capture the salient structures of images, and Matrix Factorization to learn the latent concepts from text. In this paper, we study HFL in the context of multimodal data for cross-view similarity search. They present a novel multimodal HFL method, called Para- metric Local Multimodal Hashing (PLMH), which learns a set of hash functions to locally adapt to the data structure of each modality. In DCDH, the coupled dictionary for each modality is learned with side information (e.g., categories). As a result, the coupled dictionaries not only preserve the intra-similarity and inter-correlation among multi-modal data, but also contain dictionary atoms that are semantically discriminative (i.e., the data from the same category is reconstructed by the similar dictionary atoms).

In this paper[1], author suggest a new cross-media retrieval method based on short-term and long-term relevance feedback. Our method mainly focuses on two typical types of media data, i.e. image and audio.

First, It build multimodal rep- resentation via statistical canonical correlation between image and audio feature matrices, and define cross-media distance metric for similarity measure; then they propose optimization strategy based on relevance feedback, which fuses short-term learning results and long-term accumulated knowledge into the objective function. Author present a model that generates natural language descriptions of images and their regions. This approach leverages datasets of images and their sentence descriptions to learn about the inter-modal correspondences between language and visual data. Our alignment model is based on a novel combination of Convolution Neural Networks over image regions, bidirectional Recurrent Neural Networks over sentences, and a structured objective that aligns the two modalities through a multimodal embedding

3. SYSTEM OVERVIEW:

The Semantic Cross Media Hashing(SCMH) model combines more data method in a unitary representation that can be used for classification and recovery. Image search is an important method to find images contributed by social users in such social websites. However, how to make the top ranked result relevant and with diversity is challenging. A fundamental problem in there-ranking of the images or texts social image retrieval is how to reliably solve these images or texts mismatch problems.

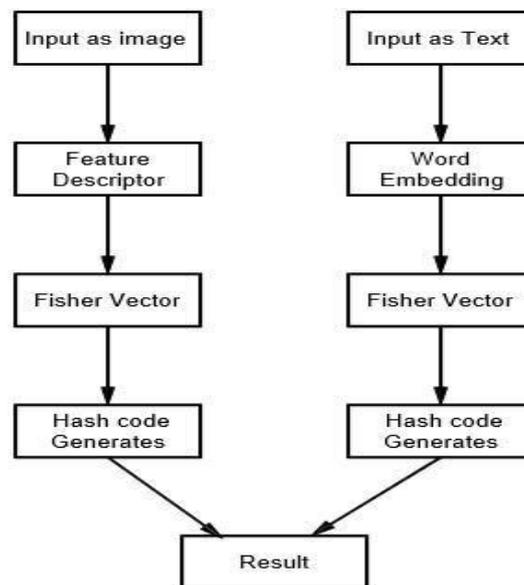


Fig. 1. System Architecture.

We use a novel hashing method, called semantic cross- media hashing (SCMH), to perform the near- duplicate de- tecton and cross media retrieval task. We propose to use a set of word embeddings to represent textual information. Fisher kernel framework is incorporated to represent both textual and visual information with fixed length vectors. For mapping the Fisher vectors of different modalities, a deep belief network is proposed to perform the task. We evaluate the proposed method SCMH on two commonly used data sets. SCMH achieves better results than state-of-the-art methods with different the lengths of hash codes.

- SIFT Descriptor SIFT Descriptor is used for representing Images, we use SIFT detector to extract image key points. SIFT descriptor is used to calculate descriptors of the extracted key points and a variable size set of points in SIFT descriptor space represents each image.

- Skip Gram Skip-gram algorithm is used for word embedding. After Skip-descriptor steps, a variable size set of points in the embeddings space represents the text.

Given a collection of text-image bi-modality data, we firstly represent image and text respectively. Through table lookup, all the words in a text are transformed to distributed vectors generated by the word embeddings learning methods. For representing images, we use SIFT detector to extract image keypoints. SIFT descriptor is used to calculate descriptors of the extracted keypoints. After these steps, a variable size set of points in the embeddings space represents the text, and a variable size set of points in SIFT descriptor space represents each image. Then, the Fisher kernel framework is utilized to aggregate these points in different spaces into fixed length vectors, which can also be considered as points in the gradient space of the Riemannian manifold. Henceforth, texts and images are represented by vectors with fixed length. Finally, the mapping functions between textual and visual Fisher vectors (FVs) are learned by a deep neural network. We use the learned mapping function to convert FVs of one modality to another. Hash code generation methods are used to transfer FVs of different modalities to short length binary vectors.

4. CONCLUSION:

In this work, the system uses a new hashing method, SCMh a duplicate and cross-media detection restoration activity. This system uses a series of words to represent textual information. The Fisher Framework Kernel built to represent both textual and visual information with fixed length vectors. To map the Fisher vectors of different modes, a network of deep beliefs intends to do the operation. SCMh best avant-garde methods with different the lengths of hash codes.

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Ontology Based Approach for Project Proposal Selection Using Text Mining Approach

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Abstract: Research and Development (R&D) project proposals selection is one of the decision-making task commonly found in government funding agencies, universities, research institutes, and technology intensive companies. With the rapid development of research work in projects, research project selection & classification into different domain is a necessary task for the research funding agencies. It is common to group the large number of research proposals, received by the research funding agencies based on their similarities into research discipline areas. Text Mining has emerged as a definitive technique for extracting the unknown information from large text document for the proposal classification. Ontology is a knowledge repository in which concepts and terms are defined as well as relationships between these concepts. Thus, ontology can automate information processing and can facilitate text mining in a specific domain (such as research project selection). This paper presents approach towards ontology-based text-mining to cluster research proposals based on their similarities in research areas. The method also includes an optimization model for balancing proposals by geographical regions. The grouped proposals are then assign to the appropriate research experts for peer-review through system itself. The proposed method is milestone over the manual approach for classifying proposals.

Keyword: Feature extraction, Feature Selection, Semantic Similarity, Term Frequency Inverse Document Frequency.

1. INTRODUCTION:

Selection of research projects is an important and recurring activity in many organizations such as government research funding agencies. It is a challenging multiprocess task that begins with a call for proposals (CFP) by a funding agency. The CFP is distributed to relevant communities such as universities or research institutions. The research proposals are submitted to the funding agency and then are assigned to experts for peer review. The review results are collected, and the proposals are then ranked based on the aggregation of the experts' review results. A document is represented by a set of words that expresses its global meaning. In traditional approaches, a document is represented by a group of words describing its contents. Semantic approaches aim to give meaning to the terms of the document to address the shortcomings of traditional indexing based on single words. ^[1]

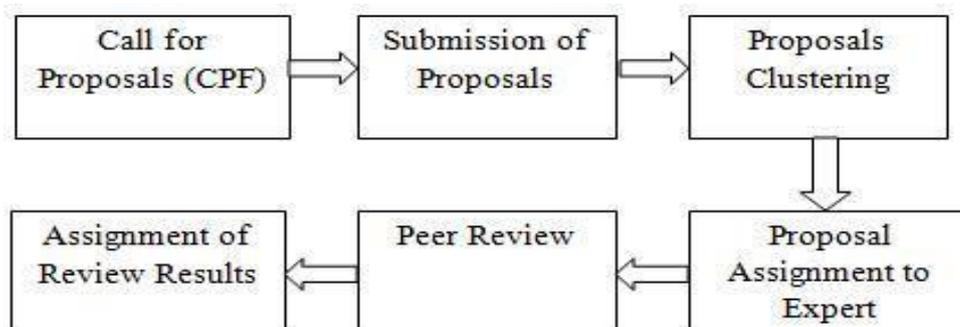


Fig.1 Research Project Selection & Classification Process

For Text documents to be classified, they are being processed and transformed from the full text version to a document vector, which makes the handling of them much easier and reducing their complexity.

This paper is organized as follows. A related work is discussed in Section II, The main phases of the Ontology based for proposal classification model are introduced, proposing an efficient approach for based on the hierarchy of WordNet ontology, in Section IV, Experimental results and performance evaluation are presented in Section V. Finally, conclusions are given in Section VI.

2. LITERATURE REVIEW:

Selection of research projects is an important research topic in research and development (R&D) project management. Previous research deals with specific topics, and several formal methods and models are available for this purpose. For example, Jain and Wei xu [1] proposed a fuzzy-logic-based model as a decision tool for project selection. M. Uma [2] and Archer offered a decision support approach to project portfolio selection. E.Sathya [2] and Bhattacharya proposed a fuzzy logic approach to project selection. Butler used a multiple attribute utility theory for project ranking and selection. Loch and Mrs.Punitha [3] established a dynamic programming model for project selection, while Meade and J.Butter [4] developed an analytic network process model. Cook presented a method of optimal allocation of proposals to reviewers in order to facilitate the selection process. Arya and Morrice [4] proposed a rotation program method for project assignment. Jain [1] and Park used text-mining approach for R&D proposal screening. Dr.M.Punithavalli [3] offered an empirical study to value projects in a portfolio. Sun developed a decision support system to evaluate reviewers for research project selection. Finally, Sun proposed a hybrid knowledge-based and modeling approach to assign reviewers to proposals for research project selection. Methods have been developed to group proposals for peer review tasks.

Unfortunately, proposals with similar research areas might be placed in wrong groups due to the following reasons: first, keywords are incomplete information about the full content of the proposals. Second, keywords are provided by applicants who may have subjective views and misconceptions, and keywords are only a partial representation of the research proposals. Third, manual grouping is usually conducted by division managers or program directors in funding agencies. Text-mining methods (TMMs) have been designed to group proposals based on understating the English text, but they have limitations when dealing with other language texts. The proposed approach has been successfully tested at the NSFC. The experimental results indicated that the method can also be used to improve the efficiency and effectiveness of the research project selection process.

3.EXISTING SYSTEM:

The existing system is an Ontology-Based Text-Mining Method to cluster research proposals based on their similarities in research areas [2]-[4]. Ontology is a knowledge repository in which concepts and terms are defined as well as relationships between these concepts. It consists of a axioms, relationships and set of concepts that describe a domain of interests and represents an agreed-upon conceptualization of the domain's "real-world" setting. Implicit knowledge for humans is made explicit for computers by ontology. Thus, ontology can automate information processing and can facilitate text mining in a specific domain (such as research project selection). An ontology based text mining framework has been built for clustering the research proposals according to their discipline areas. The existing system of OTMM for proposals classification is desktop based. The operations at server side have to be performed manually. In the NSFC, the number of research proposals received has more than doubled in the past four years, with over 110000 proposals submitted in one deadline in March 2010. Four to five reviewers are assigned to review each proposal so as to assure accurate and reliable opinions on proposals. To deal with the large volume, it is necessary to group proposals according to their similarities in research disciplines and then to assign the proposal groups to relevant reviewers. This task is being performed manually in the existing system.

4 RELATED WORK :

In the NSFC, after proposals are submitted, the next important task is to group proposals and assign them to reviewers. The proposals in each group should have similar research characteristics. For instance, if the proposals in a group fall into the same primary research discipline (e.g., supply chain management) and the number of proposals is small, manual grouping based on keywords listed in proposals can be used. However, if the number of proposals is large, it is very difficult to group proposals manually. Although there are several text-mining they are developed with a focus on English text. For example, Chinese text consists of strings of Chinese characters, while English text uses words. Also, Chinese text has no delimiters to mark word boundaries, while English text uses a space as word delimiter. Several methods were proposed to deal with Chinese text but they are not efficient or sufficiently robust to process research proposals. The client submits the proposal to the server. All the processing activities will take place at server only and then proposal will be get assigned to particular expert. Expert will get notification about assignment.

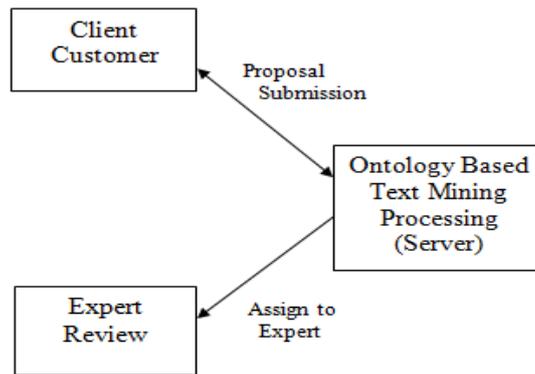


Fig. 2 Client-Server Model

An ontology is a knowledge repository in which concepts and terms are defined as well as relationships between these concepts. It consists of a set of concepts, axioms, and relationships that describe a domain of interests and represents an agreed-upon conceptualization of the domain’s “real-world” setting. Implicit knowledge for humans is made explicit for computers by ontology. Thus, ontology can automate information processing and can facilitate text mining in a specific domain (such as research project selection). The proposed OTMM is used together with statistical method and optimization models and consists of four phases, as shown in Fig.3 First, a research ontology containing the projects funded in latest five years is constructed according to keywords, and it is updated annually (phase 1). Then, new research proposals are classified according to discipline areas using a sorting algorithm (phase 2). Next, with reference to the ontology, the new proposals in each discipline are clustered using a self-organized mapping (SOM) algorithm (phase 3). Finally, (phase 4) if the number of proposals in each cluster is still very large, they will be further decomposed into subgroups where the applicants’ characteristics are taken into consideration (e.g., applicants’ affiliations in each proposal group should be diverse). Each phase with its details is described in the following sections.

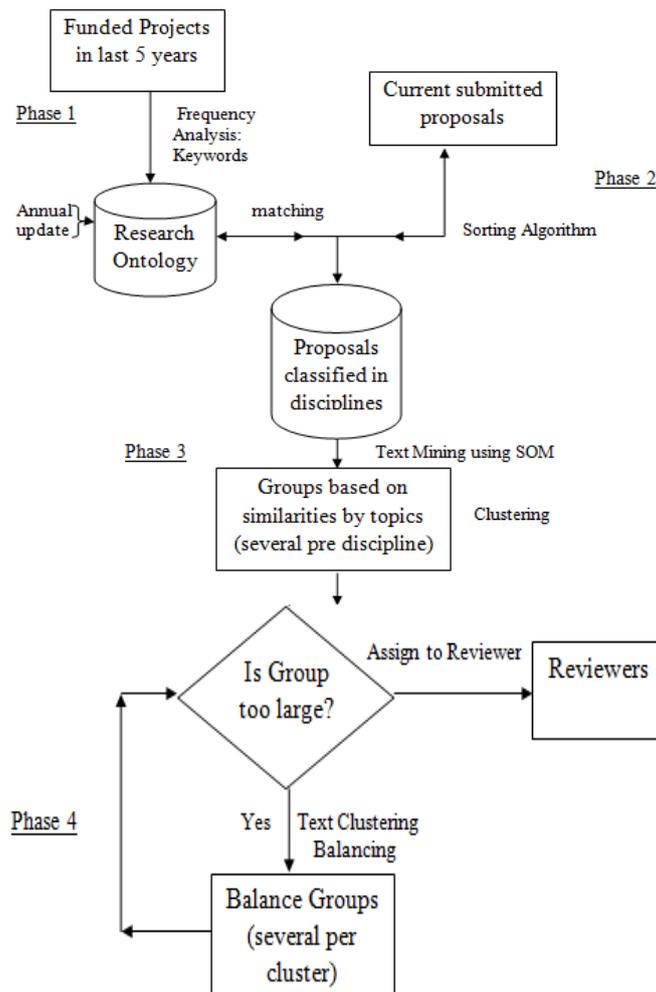


Fig .3 Process of Proposed OTMM

A. Phase 1: Constructing a Research Ontology

Funding agencies such as the NSFC maintain a directory of discipline areas that form a tree structure. As a domain ontology a research ontology is a public concept set of the research project management domain. The research topics of different disciplines can be clearly expressed by a research ontology. Suppose that there are K discipline areas, and A_k denotes discipline area k ($k = 1, 2, \dots, K$).

Research ontology can be constructed in the following three steps to represent the topics of the disciplines.

Step 1) Creating the research topics of the discipline A_k , ($k = 1, 2, \dots, K$).

The keywords of the supported research projects each year are collected, and their frequencies are counted (shown in Fig. 3). The keywords and their frequencies are denoted by the feature set $(N_{ok}, ID_k, \text{year}, \{(keyword_1, frequency_1), (keyword_2, frequency_2), \dots, (keyword_k, frequency_k)\})$, where N_{ok} is the sequence number of the k th record and ID_k is the corresponding discipline code. For instance, if discipline A_k has two keywords in 2007 (i.e., "data mining" and "business intelligence") and the total number of counts for them are 30 and 50, respectively, the discipline can be denoted by $(N_{ok}, ID_k, 2007, \{(data\ mining, 30), (business\ intelligence, 50)\})$. In this way, a feature set of each discipline can be created. The keyword frequency in the feature set is the sum of the same keywords that appeared in this discipline during the most recent five years and then, the feature set of A_k is denoted by $(N_{ok}, ID_k, \{(keyword_1, frequency_1), (keyword_2, frequency_2), \dots, (keyword_k, frequency_k)\})$.

Step 2) Constructing the research ontology.

First, the research ontology is categorized according to scientific research areas introduced in the background. It is then developed on the basis of several specific research areas. Next, it is further divided into some narrower discipline areas. Finally, it leads to research topics in terms of the feature set of disciplines created in step 1. The research ontology is constructed, and its rough structure is shown in Fig. 5. It is more complex than just a tree-like structure. First, there are some cross-discipline research areas (e.g., "data mining" can be placed under "Information Management" in "Management Sciences" or under "Artificial Intelligence" in "Information Sciences"). Second, there are some synonyms used by different project applicants, which have different names in different proposals but represent the same concepts. Therefore, the research ontology allows more complex relationship between concepts besides the basic tree-like structure. Also, to deal with proposals with both English and Chinese text, it is designed as a multilingual ontology, which can process and share knowledge represented in multiple languages.

Step 3) Updating the research ontology.

Once the project funding is completed each year, the research ontology is updated according to agency's policy and the change of the feature set. Using the research ontology, the submitted research proposals can be classified into disciplines correctly, and research proposal in one discipline can be clustered effectively and efficiently. The details will be given in the following two sections.

Phase 2: Classifying New Research Proposals Into Disciplines Proposals are classified by the discipline areas to which they belong. A simple sorting algorithm is used next for proposals' classification. This is done using the research ontology as follows.

Suppose that there are K discipline areas, and A_k denotes area k ($k = 1, 2, \dots, K$). P_i denotes proposals i ($i = 1, 2, \dots, I$), and S_k represents the set of proposals which belongs to area k . Then, a sorting algorithm can be implemented to classify proposals to their discipline areas.

Phase 2: Classifying New Research Proposals Into Disciplines

Proposals are classified by the discipline areas to which they belong. A simple sorting algorithm is used next for proposals' classification. This is done using the research ontology as follows.

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S_k represents the set of proposals which belongs to area k .

Phase 3: Clustering Research Proposals Based on Similarities

Using Text Mining after the research proposals are classified by the discipline areas, the proposals in each discipline are clustered using the text-mining technique. The main clustering process consists of five steps, text document collection, text document pre-processing, text document encoding, vector dimension reduction, and text vector clustering.

The details of each step are as follows.

Step 1) Text document collection. After the research proposals are classified according to the discipline areas, the proposal documents in each discipline A_k ($k = 1, 2, \dots, K$) are collected for text document pre-processing.

Step 2) Text document pre-processing. The contents of proposals are usually non-structural. Because the text of the proposals consists of Chinese characters which are difficult to segment, the research ontology is used to analyze, extract, and identify the keywords in the full text of the proposals. For example, "Research on behaviour modelling and detection methods in financial fraud using ensemble learning" can be divided into word sets {"behavior modeling," "detection method," "financial fraud," "ensemble learning"}. Finally, a further reduction in the vocabulary

size can be achieved through the removal of all words that appeared only a few times (say less than five times) in all proposal documents.

Step 3) Text document encoding. After text documents are segmented, they are converted into a feature vector representation: $V = (v_1, v_2, \dots, v_M)$, where M is the number of features selected and v_i ($i = 1, 2, \dots, M$) is the TF-IDF encoding of the keyword w_i . TF-IDF encoding describes a weighted method based on inverse document frequency (IDF) combined with the term frequency (TF) to produce the feature v , such that $v_i = t_{fi} \log(N/df_i)$, where N is the total number of proposals in the discipline, t_{fi} is the term frequency of the feature word w_i , and df_i is the number of proposals containing the word w_i . Thus, research proposals can be represented by corresponding feature vectors.

Step 4) Vector dimension reduction. The dimension of feature vectors is often too large; thus, it is necessary to reduce the vectors' size by automatically selecting a subset containing the most important keywords in terms of frequency. Latent semantic indexing (LSI) is used to solve the problem. It not only reduces the dimensions of the feature vectors effectively but also creates the semantic relations among the keywords. LSI is a technique for substituting the original data vectors with shorter vectors in which the semantic information is preserved. To reduce the dimensions of the document vectors without losing useful information in a proposal, a term-by-document matrix is formed, where there is one column that corresponds to the term frequency of a document. Furthermore, the term-by-document matrix is decomposed into a set of eigenvectors using singular-value decomposition. The eigenvectors that have the least impacts on the matrix are then discarded. Thus, the document vector formed from the term of the remaining eigenvectors has a very small dimension and retains almost all of the relevant original features.

Step 5) Text vector clustering. This step uses an SOM algorithm to cluster the feature vectors based on similarities of research areas. The SOM algorithm is a typical unsupervised Learning neural network model that clusters input data with Similarities.

SOM Algorithm:

1. Select output layer network topology.
 - 1.1 Initialize current neighborhood distance, $D(0)$, to a positive value
2. Initialize weights from inputs to outputs to small random values
3. Let $t = 1$
4. While computational bounds are not exceeded do
 - 4.1 Select an input sample
 - 4.2 Compute the square of the Euclidean distance of from weight vectors (w_j) associated with each output node. $\sum_{k=1}^n (i_{1,k} - w_{j,k}(t))^2$
 - 4.3 Select output node j^* that has weight vector with minimum value from step 2.
 - 4.4 Update weights to all nodes within a topological distance given by $D(t)$ from j^* , using the weight update rule: $w_j(t+1) = w_j(t) + \eta(t)(i_1 - w_j(t))$
 - 4.5 Increment t
5. End while.

D. Phase 4: Balancing Research Proposals and Regrouping Them by Considering Applicants' Characteristics In this phase, when the number of proposals in one cluster is still very large (e.g., more than 20), the applicants' characteristics (e.g., affiliated universities) are considered. In the past, reviewers sometimes handled proposals improperly, having poor group composition (e.g., the same affiliation in a specific proposal group). Reviewers may feel confused and uncomfortable when evaluating proposals that may have poor group composition, so it is advisable that the applicants' characteristics in each proposal group should be as diverse as much as possible. Furthermore, the group size in each group should be similar.

5. RESULT & PERFORMANCE ANALYSIS

Result & performance analysis of Proposals Classification and Clustering using Keyword Identification and Segmentation approach. Let the set of proposals relevant to the research domain denoted by $\{\text{Relevant}\}$ and set of proposals accepted from users denoted by $\{\text{Retrieved}\}$. Set of proposals that are both relevant and retrieved, are denoted as: $\{\text{Relevant}\} \cap \{\text{Retrieved}\}$.

5.1 Effect of Increase in Number of Proposals

To validate the proposed approach, several experiments are conducted using the previous granted research projects. First, two experiments (E1 and E2) are constructed to evaluate the quality of clustering research projects. Second, one experiment (E3) is used to validate the effectiveness and efficiency of balancing research projects. In E1, research projects in the discipline called information science are randomly selected. In E2, research projects in the discipline named chemical science are randomly used. In E3, research projects with similar topics are randomly

selected. In addition, the typical criterion for text clustering F measurement is used to measure the quality of clustering research projects. For generated cluster c and predefined research topic t , the corresponding Recall and Precision can be calculated as follows:

$$\text{Precision}(c, t) = n(c, t) / n_c$$

$$\text{Recall}(c, t) = n(c, t) / n_t$$

where $n(c, t)$ is the project number of the intersection between cluster c and topic t .

n_c is the number of projects in cluster c ,

n_t is the number of projects in topic t .

F measurement between cluster c and topic t can be calculated as follows:

$$F(c, t) = (2 * \text{Recall}(c, t) * \text{Precision}(c, t)) / (\text{Recall}(c, t) + \text{Precision}(c, t))$$

In order to compare the clustering quality of the OTMM and the general TMM, the other settings of both methods are kept the same as possible. The relations between F measurement and the number of research projects n in these two disciplines can be found in below figures. It can be seen that the performance of our proposed method is better than that of the standard TMM. Therefore, the OTMM can be an alternative for clustering research proposals.

Table 1 Calculations of E1

Number of Proposals	Precision	Recall	F_measure
5	0.20	1	0.33
10	0.10	1	0.19
15	0.15	1	0.23
20	0.25	1	0.40

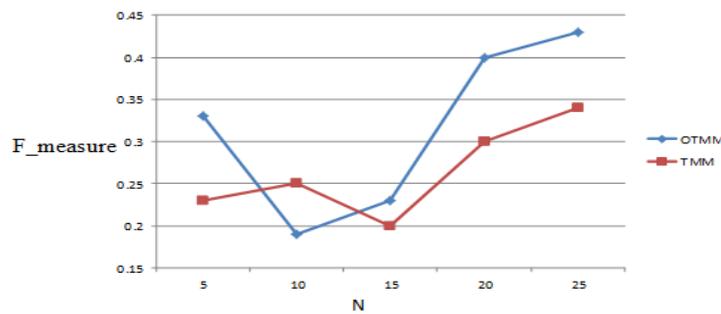


Fig. 4 Graph of E1

Table 2. Calculations of E2

Number of Proposals	F_measure
5	0.20
10	0.27
15	0.29
20	0.23

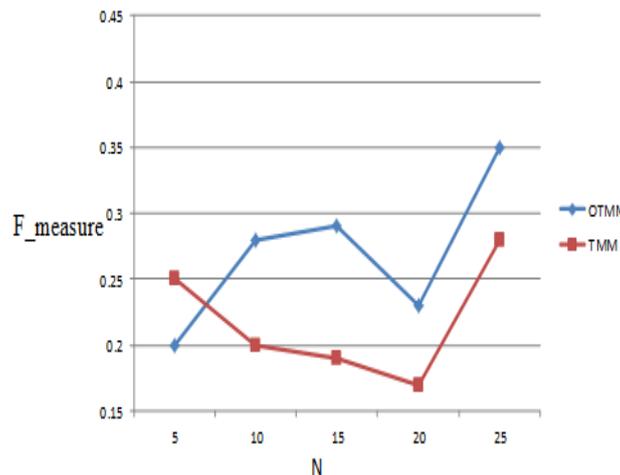


Fig.5 Graph of E2

Similarly, tested our system for large number of proposals. If subjected our system to number of proposals like 100, 200, ..., 1000, the results may get as shown in below graph.

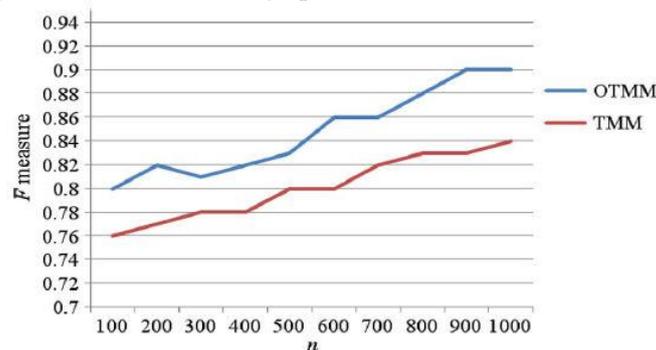


Fig. 6 Relative Graph

The experimental results showed that the proposed method improved the similarity in proposal groups, as well as balanced the applicants' characteristics. Therefore, the proposed method promotes the efficiency in the proposal grouping process. By manual grouping, users need to spend at least one week, while the grouping can be finished within hours using the proposed methods. Given that the method can expedite the process considerably, it can be used as the first step in a machine-human collaboration where the automatic grouping results are provided to a human that checks and then approves or modifies them.

6. CONCLUSION AND FUTURE WORK:

In this paper, Ontology based classification and clustering approach is proposed, which is used by research funding agencies for grouping the Research Proposals and the research Reviewers. It also facilitates text-mining and optimization techniques to cluster research proposals based on their similarities and then to balance them. This Proposed approach can provide us a way to easily classify and group the research proposals and the reviewers. Future work can be done for enhancements in the proposed system such as provide the mail indication to reviewer to which research proposals for peer review are assigned. System may also store the reviewer's history and assignment on basis of that. The situation might occur where a reviewer may have expertise in more than one domain. So, priority has to be deciding for assignment of proposals to reviewers. It may be possible that system automate the work of reviewer.

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MICROBIAL FUEL CELL TECHNOLOGY FOR WASTEWATER TREATMENT AND ELECTRICITY GENERATION

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Abstract: Production of energy resource while minimizing the waste is one of the best ways for sustainable energy resource management practices. Application of Microbial Fuel Cells (MFCs) may represent a completely new approach to wastewater treatment with production of sustainable clean energy. The increase in energy demand can be fulfilled by Microbial Fuel Cell (MFC) in future. In recent years, researchers have shown that MFCs can be used to produce electricity from water containing glucose, acetate or lactate. Studies on electricity generation using organic matter from the wastewater as substrate are in progress. Waste biomass is a cheap and relatively abundant source of electrons for microbes capable of producing electrical current outside the cell. Rapidly developing microbial electrochemical technologies, such as microbial fuel cells, are part of a diverse platform of future sustainable energy and chemical production technologies. It is the innovative research area for production of energy source from waste water. Microbial fuel cells (MFCs) represent a completely new long term, affordable, accessible and ecofriendly approach to waste water treatment with production of sustainable energy.

Keyword: Microbial Fuel cell, bioelectricity, wastewater, salt bridge.

1.INTRODUCTION:

While the world population is growing, energy and water resources are becoming limited. These issues are causing concerns about global food security for the first time since the Green Revolution of the 1960's. An additional challenge associated with population growth is the increase in wastewater generation and environmental pollution. To address those serious problems, advances in research have been made to improve water management and to make wastewater treatment more effective and efficient. Also, alternative renewable energy sources (bioenergy, geothermal, solar, wind etc.) have been investigated and applied. Microbial fuel cell (MFC) is a sustainable technology that has potential to treat wastewater while producing electricity and thus providing a solution for water and energy shortages. Unlike some renewable energy sources competing with food production for land and water, MFC can use organics in waste streams as energy source and enhance food security by providing treated water that could be applied in irrigation.

In the present study, mediator-less microbial fuel cells were used for electric current generation and simultaneous treatment of the wastewater.

2.LITERATURE REVIEW:

B.G. Mahendra and Shridhar Mahavarkar studied the microbial fuel cell technology, and were able to treat domestic and dairy wastewater successfully, and microorganisms present in the wastewater are used for electricity generation and found that COD & TDS single chamber air cathode MFC proves to be more reliable because of the reduced cost of construction, low maintenance and higher electricity generation when compared with double chambered MFC. The performance of MFCs decreased, with the decrease in the wastewater concentrate generation in these systems can be increased, MFC technology may provide a new method to offset wastewater treatment plant operating cost, making wastewater treatment more affordable for developing and developed nations. Thus, the combination of wastewater treatment along with electricity production may help in saving money as a cost of wastewater.

Smita Raghuvanshib et.al found that the assessment of a waste water treatment plant at a university campus. It has been found that the electricity required carrying out the whole treatment process. (Water collection, sludge activation, treatment, purification, and re-distribution) has the highest impact in all assessment categories. It has also been observed that the use of treated water for irrigation purpose is mitigating the impact generated by the treatment process to a large extent and ultimately decreases the environmental burden. It is to be noted that the global warming potential increases with the treatment but the water depletion potential decreases. This study helps the decision makers to take an informed decision to select between treatment and no-treatment (no reuse) of wastewater. This study limits its analysis within the system boundary under consideration. However, this study has not considered the use of sludge for fields as a replacement of fertilizers. Studies like this can guide the authorities and government to optimize the process parameters to reduce the environmental impact. This wastewater treatment model can be extended to assess the environmental impacts of the larger areas like cities or towns where the wastewater supply and redistribution network also plays a vital role in the energy consumption. It will be interesting to see the combined negative environmental impact of treatment and positive effects of treated water reuse and sludge use as compost for gardening and/or agriculture.

Behzad Kanani studied that MFCs are based on using green fuels and on converting their latent chemical energy into electrical energy. Therefore, various substrates including hydrocarbons, volatile fatty acids, alcohols, amino acids, proteins, and even inorganic materials have been used in this system. Of course, wastewater contain materials that are of different levels of bio- degradability, and the higher the percentages of materials with high levels of biodegradability are, the greater quantities of electricity will be generated. Therefore, these systems can be used in treatment plants and in factories for treating the outgoing wastewater and also for recovering part of the energy consumed by the units. This will reduce costs and, more importantly, will protect the environment. However, more applied research is needed to make this system operational and economically justifiable.

Pallavi C.K and Udayashankara T.H found that the increased human activities and consumption of natural energy resource have led to decline fossil fuels. Moreover, using of fossil fuels may cause environmental pollution. MFC is a technology for the treatment of wastewater and significant energy recovery. Recent advances have investigated the use of different sources of substrates in terms of wastewaters which has a great potential over degrading organics and efficient bioelectricity production. This review summarizes the various wastewaters as substrates that have been used in MFCs for wastewater treatment along with power generation. It is expected for the operational and technological improvements as well as cost effectiveness and performance efficiency required to scale up and to use MFC as a renewable energy resource and effluent treatment. Also necessary to research further for the development of MFC at large scales.

B.K. Pande and V. Mishra studied that the Microbial fuel cells (MFCs) represent a completely new long term, affordable, accessible and eco-friendly approach to waste water treatment with production of sustainable energy. The power generation efficiency in microbial fuel cells (MFCs) is based on bioreactors, which may represent a completely new approach to wastewater treatment. In our experimental test we found that it is possible to generate electricity using bacteria while accomplishing waste water treatment in process based on microbial fuel cell technologies. Tests were conducted using a single chamber microbial fuel cell (SCMFC) containing eight graphite electrodes (anodes) and a single cathode. The prototype SCMFC generated electrical power (maximum 18 mWm⁻²). Power generation in these systems can be increased by using suitable electrodes with the choice of appropriate bioreactor and fuel.

Doddamani K.R. and Mise S.R studied that the application of microbial fuel cell (MFC) for electricity generation has been developing recently. This research explores the application of single chamber MFC in generating electricity using sugar wastewater. The different concentration of wastewater has been performed. The maximum current, voltage, BOD, COD, pH and TDS obtained with respect to time. MFC of sugar mill wastewater showed removal efficiency 69.3% COD, 68.1% BOD and 56.35% TDS with different feed concentration. The current, voltage and power generation in the reactor is 1.28mA, 0.9 V and 0.304 watts/m² respectively.

Wastewater Sampling from Nallha:

The Sewage influent was collected from the discharge channel outlet of “Sanjivani Group of institute” Kopargaon, Ahemadnagar district, Maharashtra, India. Before sampling the effluent, the polythene container was cleaned thoroughly using distilled water. Immediately after the effluent sampling, the effluent sample was taken to the laboratory and stored at room temperature in the laboratory for further analysis using standard methods.

Charcteristics of Domestic wastewater sample before and after Treatment.

Sr no	Characteristics	Unit	Domestic Wastewater Before treatment	Domestic Wastewater After treatment
1	pH	-	5.83	7.6
2	Total Dissolved Solids	(mg/L)	154	143
3	BOD ₅ @25°C	(mg/L)	176	145
4	COD	(mg/L)	276	198

Observation table for Electricity Generation-

SR.NO	Electrode material	Observations	Electricity Generation (ma)
1	Graphite Leads attached with Copper wire.	Day1	148
2		Day2	160
3		Day3	179
4		Day4	175
5		Day5	240
6		Day6	262
7		Day7	280
8		Day8	298
9		Day9	696
10		Day10	1100
11		Day11	1272
12		Day12	1514

Fabrication of MFC Chamber-

Following are the name and description of the components used for the design of cell:

Table. Design Components for Cell

Sr. No	Component	Description of the Component	Model
1	Cathode Chamber	The cathode chamber consist of plastic container of volume 1lt.which is non-reactive, non-conducting and holds the Electrode in an aqueous solution. The final reaction reduction of oxygen occurs in this chamber. This chamber was filled with Distilled water having pH 7. This chamber is completely sealed off from the outside environment by means of a wax and cello tape.	
2	Cathode Electrode	The Cathode electrode is composed of graphite which is 2mm diameter, and 15 cm long. The Cathode Electrode is composed of graphite since the material of construction was already decided before testing began in the experimental prototypes.	

3	Salt Bridge	<p>Since Proton Exchange Membranes are very expensive and fragile, an agar salt bridge was used. The salt bridge is prepared by taking 50ml of distilled water in a beaker, heat it till boiling, then add to 65gm agar and 50gm common salt stir continuously so that all the filaments gets break and even viscous solution is formed. Fill this solution in a 1/2" diameter and 10 cm long PVC pipe by keeping on side closed. Keep this filled pipe in refrigerator so that it can be used.</p>	
4	Anode Chamber	<p>The anode chamber consist of plastic container of volume 10 lt. which is non-reactive, non-conducting and contains the electrode immersed in inoculated media. This chamber is completely sealed off from the outside environment by means of a wax and cello tape.</p>	
5	Anode Electrode	<p>The anode electrode is also of graphite which is 2mm diameter, and 15 cm long. This anode helps to develop the bio-film which helps to accelerate the process by multiplication of microorganisms.</p>	
6	Multimeter	<p>During the process the output in the form of voltage was measured using the Digital multimeter.</p>	
7	Circuit Assembly	<p>Two chambers were internally connected by salt bridge and externally the circuit was connected with copper wires which were joined to the two electrodes at its ends and to the multimeter by another ends.</p>	

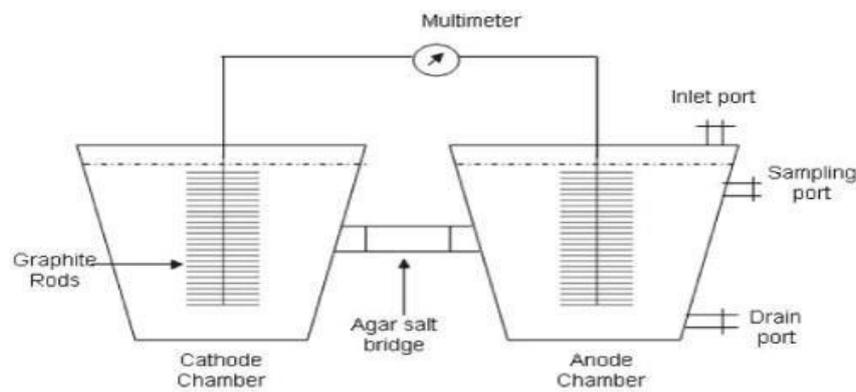


Fig 4.1 Double chambered MFC

MFC Operation

The study was conducted by feeding domestic wastewater and dairy wastewater separately to MFC-1 and MFC-2 with different strengths separately (i.e., 100% strength without any dilution, 75% & 50% strengths by diluting with distilled water 25% & 50% respectively) for both the wastewaters. The anode chamber (anaerobic chamber) was filled with wastewater and the cathode chamber (aerobic chamber where oxygen was used as electron acceptor) was filled with KCL solution (catholyte). The internal wiring of anode and cathode was connected to a multimeter to complete the circuit. The entire setup was left for 1 hr for stabilization and the reading in the multimeter was noted down every 24hrs for 12 days of operation.

2.4 Monitoring of MFCs

The current (I) in the MFC circuit was monitored at 24hr intervals using multimeter. The samples were drawn from the chambers and analysed for the variation of wastewater characteristics. Analytical procedures followed were those outlined in Standard Methods for the examination of water and wastewater characteristics.

3. RESULTS AND DISCUSSIONS:

The single and double chambered MFC were run parallel. The MFCs were operated by feeding domestic and Domestic wastewater with different wastewater concentrations separately. The effect of wastewater concentration on COD and TDS removal efficiency and current generation was observed.

4. CONCLUSIONS:

The study demonstrated that microbial fuel cell technology was able to treat domestic and dairy wastewater successfully, and microorganisms present in the wastewater are for electricity generation and COD & TDS. A single chamber air cathode MFC proves to be more reliable because of the reduced cost of construction, low maintenance and higher electricity generation when compared with double chambered MFC. The performance of MFCs decreased with the decrease in the wastewater concentration and electricity generation in these systems can be increased. MFC technology may provide a new method to offset wastewater treatment plant operating cost, making wastewater treatment more affordable for developing and developed nations. Thus, the combination of wastewater treatment along with electricity production may help in saving money as a cost of wastewater.

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